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MICROSTRUCTURES OF DIAMOND SURFACES

by S. TOLANSKY, D.Sc., F.R.S.

The original work published in this book cannot be overlooked by anyone concerned with any application of diamond.

Professor Tolansky has applied the powerful new optical techniques that he has developed—amidst world wide acclaim—to the surface of diamond. These techniques make it possible to resolve height and depth features as small as *one twenty-five millionth of an inch* and effective magnifications in depth of half a million times to be made by simple and inexpensive means.

Many facts about diamond are still unknown—the basic laws of growth, for example. The remarkable pictures obtained by Professor Tolansky enable fundamental new deductions to be made regarding the nature of diamond surfaces and therefore of the growth of diamond.

The text is written for the general reader and includes an elementary introduction to the optical techniques that have made such photographs possible.

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The Optical Techniques
Some Characteristics of Diamond
The Topography of the Natural Octahedron Faces
The Nature of the Trigons
Some Growth Features on Octahedron Faces
Linear Discontinuities on Diamonds (Slip ?)
The Etching of Diamond
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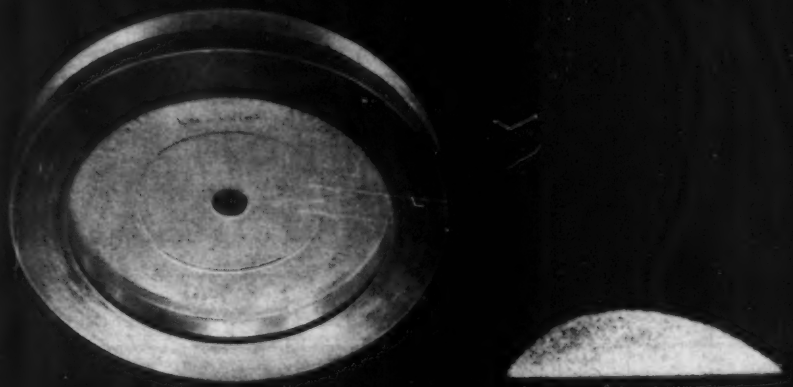

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Vol 21 No 253
December 1961

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Patrick Greene

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Generally Speaking

The Staff of Industrial Diamond Review and Industrial Diamond Abstracts wish all their readers a happy and prosperous New Year.

At this time we are looking forward to the New Year with more than usual expectancy as we wait for the first edition of the 'new look' Industrial Diamond Review and Industrial Diamond Abstracts. Last month some of the changes that are made were mentioned and on page 236 an illustration of the January cover has been included to give some idea of the appearance of the new editions. When it appears, of course, it will be in full colour. Also some more information is given which it is hoped will be of interest.

Readers Comments

The object of all these changes is to provide our readers with a more attractive and useful journal. It is, therefore, the readers who must judge the degree of success that has been achieved. Any comments or ideas from readers of the new editions will be most warmly welcomed so that we may either congratulate ourselves on any improvements or remedy any shortcomings that may be pointed out.

For our Information

Correspondence from readers need not, of course, be limited to criticism. With applications of industrial diamonds constantly increasing it is always interesting to hear of new or improved methods. Such information could be submitted in the form of an article, as a Letter to the Editor, or just as information. All such communications should be addressed to the Editor, 2, Charterhouse Street, London, E.C.1.

ADAMANT.

Holland's Diamond Industry

Holland's diamond industry, centred mainly in Amsterdam, is one of the world's most important diamond industries. It is organised largely for export, principally of cut gem diamonds. However, Holland's production of industrial diamonds and diamond tools is steadily increasing in importance and enjoys an ever-growing demand.

The Dutch diamond industry, located chiefly in Amsterdam as stated, at present comprises 22 establishments employing about 750 people. (This compares to about 35 establishments, with roughly 1,000 workers, four years ago). Although there are diamond centres in other countries that can boast more establishments and more workers, the importance of a diamond industry should not be measured merely by the number of people it employs. The significance of such a centre is determined by the quality of its end-product, and, where gem diamonds are concerned, ' made in Holland ' is practically a household word. It may be said with little fear of contradiction that the Dutch diamond industry leads the world in both craftsmanship and individual achievement.

Many famous stones cut

Many world-famous stones have been cut in the Dutch capital, including the biggest ever found—the Cullinan, which weighed 3,024 carats and was about 3.937 in. long, 2.559 in. wide and 1.968 in. thick, apart from being magnificently coloured. Two large, seven medium-sized and 96 small gems were cut from it and the four largest stones, including one of 530 carats, belong to Britain's Crown Jewels.

Two Amsterdam diamond workers were summoned to London for the cutting of the Kohinoor, another large diamond, weighing 800 carats.

Another outstanding example of Dutch fine craftsmanship is the smallest diamond ever cut : a gem with 58 facets, the size of a pin-head and weighing only 0.24 milligram.

The value of diamonds is *inter alia* due to their physical properties, especially their great hardness which makes them also suitable for numerous industrial purposes. Consequently a large number of industries use diamonds, enabling them to carry out many processes better and more economically than with other materials, and Holland does its best to meet the demand.

The country makes chemically pure diamond powder in various grain sizes ; also grinding and polishing pastes, and various types of diamond grinding wheels with metal and plastic bonding. Since the degree of fineness of the grinding wheels is determined by the grain size of the diamonds, the sorting of stones calls for much skill, and here again the Amsterdam diamond worker shows his or her capabilities, being able to sort stones of 200 to the carat.

Large diamond tool industry

The Dutch diamond industry manufactures a wide range of tools : for truing, glass-cutting, and engraving, as well as drill-bits used in geological surveys, mining and deep drilling. Cut diamonds are used in tools for profiling grinding wheels and as cutting implements for the machining of metals such as aluminium, bronze, silver, hard alloy, ceramic materials and plastics. Other items made from diamonds are indenters for hardness testers, drawing dies for fine wires for e.g. the manufacture of filament lamps, and record-player needles.

In recent years diamonds have also been used for detecting radio-activity, an application that is especially valuable in medical science. New fields will constantly be found in which the diamond can play its part, and the Dutch diamond industry is in a position to assist in the solution of many problems regarding the use of diamonds and to develop and manufacture new diamond tools.

It is, of course, preferred to work up the diamonds into gems, in view of the better prices they command, but only about 20% of the diamonds extracted are suitable for this purpose, as impurities, opacity, colour flaws, etc., make many stones unfit for processing into gems. Apart from the rarity of diamonds it is their sparkle, after polishing, which makes gems valuable, and here again the Amsterdam polishers possess traditional skills that enable them to produce particularly fine work.

Every year about 27 million carats of diamonds come on the market, of which nearly 22 million carats are utilised for technical purposes. The value of the world diamond production in 1960 was about 230 million Dollars, of which about 30 million dollars' worth was shipped to Holland.

Only a very small fraction of the diamonds processed in that country is sold on the home market. Over 95% is exported, by far the greater part of the production going to the USA. The total diamond exports in the last three years were : 1958, 98 million guilders ; 1959, 146 million guilders ; 1960, 170 million guilders.

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This growth in exports has been going on since earlier years, as may be seen from the following figures : 1954, about 72 million guilders ; 1955, about 77 million guilders ; and 1956, about 86½ million guilders. But then, world output has also increased, if one compares the aforementioned figures to the value of world diamond production, e.g., four years ago nearly 200 million dollars, of which just over 20 million dollars' worth was shipped to Holland, and the weight in stones that then came on the market, about 20 million carats, of which just over 16 million carats were used for technical purposes.

A survey of the industry

A short survey of the history of the Dutch diamond industry may be of interest. It is nearly 400 years old. When Antwerp, a diamond trade centre in the 16th century, was occupied by the Spaniards during the rising of the Netherlands against Spain, many diamond workers fled to Amsterdam, where they were joined by Jewish emigrants from Portugal and Spain. That was the start of Holland's diamond industry.

At that time diamonds were made for ornament only ; the grinding mills were driven by manpower. Later on, horses were used to turn the mills. The rough stones came chiefly from India. In 1725, diamonds were also discovered in Brazil —then Portuguese possession—and the Dutch Consul in Lisbon was able to negotiate a contract whereby all diamonds found in Brazil had to be sent to Holland. The quantity involved was considerable, and the deal led eventually to a great expansion of the Dutch diamond industry and diamond trade.

The diamond industry's prosperity was halted by the French occupation at the beginning of the 19th century, but soon afterwards it gradually started to revive. About 1830, steam power displaced horses as a means of driving the mills. This was followed by the transition from cottage industry to factory industry. The entire diamond industry in Amsterdam was concentrated in a single building, and a steam engine served to drive 168 mills which were hired to the diamond workers for a low rent. The industry expanded and numerous individual enterprises were born. By about 1860 there were 165 diamond cutting, cleaving and setting establishments, employing a total of about 800 workers.

The industry, of course, had its fluctuations. Periods of prosperity were followed by steep declines, usually accompanied by a drain of skilled workers to other industries, or even to other countries.

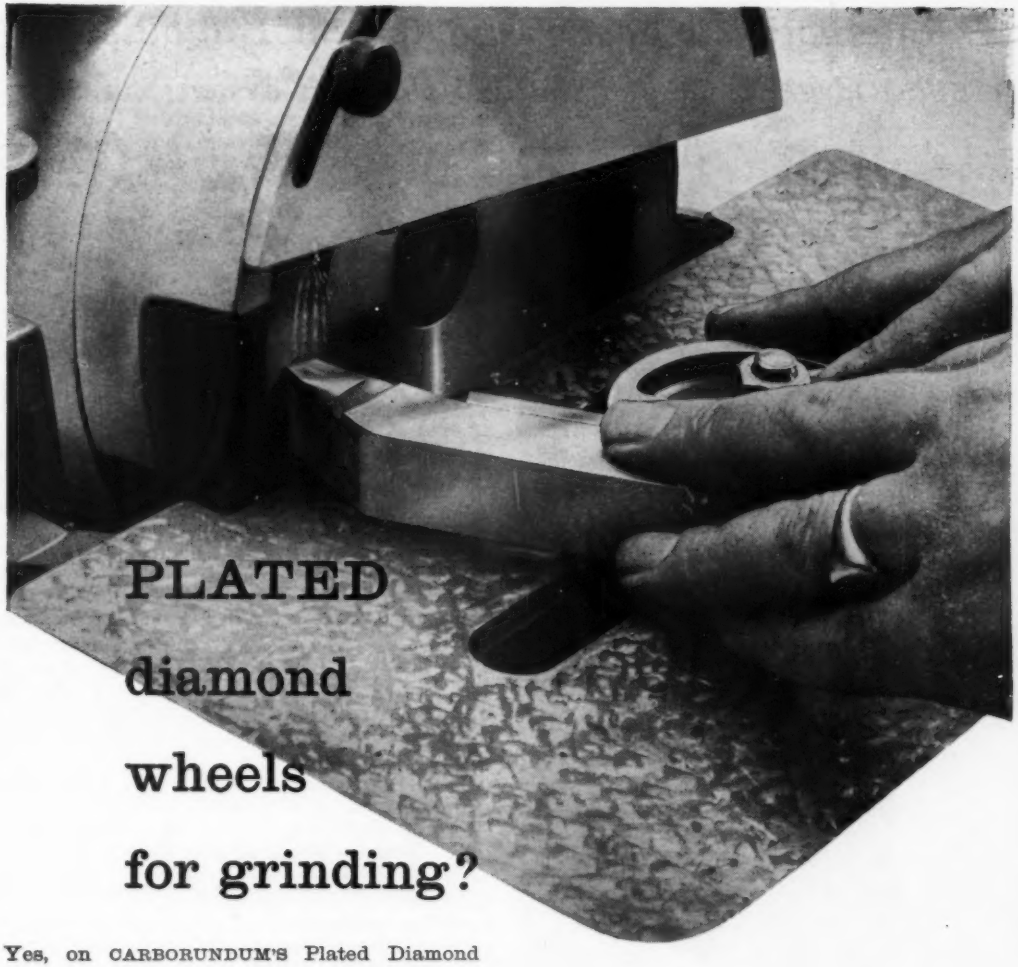
After the Franco-Prussian war of 1870-1871, and as a result of the discovery of diamond fields in South Africa that surpassed in wealth all the deposits known up to then, a new period of great prosperity began for the diamond industry. There was an abundant supply of raw material for Amsterdam and a large demand for cut stones, with as principal customers the USA, France, the Balkan States, Russia and Germany. There was a shortage of skilled workers, and wages soared. During this period, known as 'The Cape Period', good diamond cutters earned fantastically high wages. Many workers had so much money that they allegedly lit banknotes to light their cigars. Money was spent lavishly, and only a few craftsmen—with ambition and foresight—used their money to set up new businesses. These have since developed into important enterprises of international renown.

By about the middle of the 1870's this boom had to come to an end. Meanwhile, however, an industry employing several thousand people had grown up and Amsterdam had acquired the reputation of having the world's best diamond cutters.

Through alternating periods of prosperity and decline Amsterdam remained the diamond capital of the world. But World War II dealt the Dutch diamond industry a heavy blow. Of the thousands of diamond workers and dealers, only a few hundred survived the war.

Diamonds regularly exhibited

Exhibitions are regularly organised in Amsterdam with a view to giving an idea of the Dutch diamond industry's achievements and craftsmanship. The biggest, and most instructive, ever held was the 1957 ' Amsterdam—Diamond City ' Exhibition, where on 20 large stands with a total area of about 26,910 square feet and in 17 showcases ornamental and industrial diamonds worth some 20 million guilders were displayed. The show's outstanding exhibit was the famous 44½ carat Hope diamond. There were demonstrations of the processing of a diamond, from the rough state to the final product, and the industrial application of diamonds was also demonstrated, while a review was given of all the achievements of the Dutch diamond industry in the field of industrial diamonds.



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International Factory Equipment Exhibition

Fine Measuring Equipment and Hardness Testers Shown

The 'Finotest' No. 536 low-load hardness tester, which is manufactured by Karl Frank GmbH, of Germany, and marketed in the United Kingdom by the Industrial Instruments Division of Ingersoll Locks Ltd., 9 Harp Lane, Great Tower Street, London E.C.3, was among several interesting instruments shown at the International Factory Equipment Exhibition held recently at Earls Court, London.

Figure 1 shows the 'Finotest' to be a sturdy and compact instrument for carrying out hardness tests according to Vickers, Knoop, Grodzinski and Brinell. It is provided with a 136 deg. diamond pyramid for Vickers tests and a Knoop diamond point and a Grodzinski indenter can be supplied as extras.

Fig. 1.

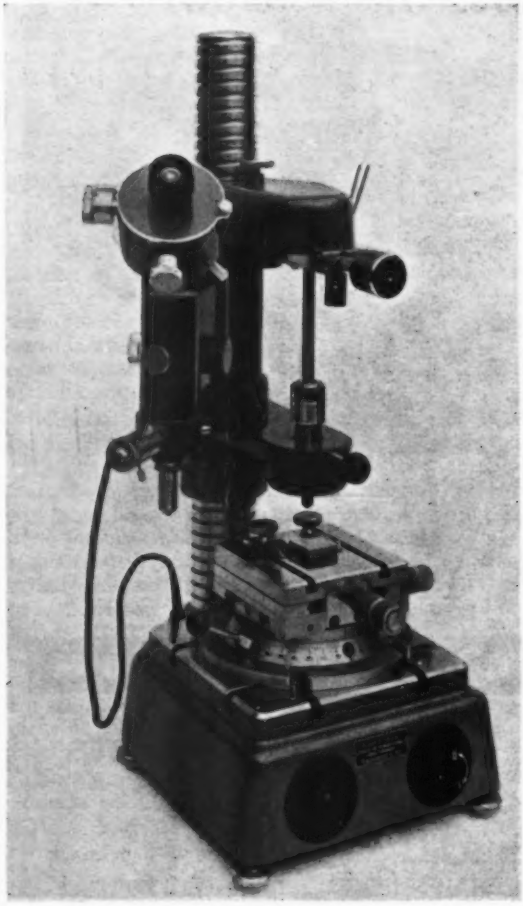

Fig. 2.

It can be used for testing thin metal strip, chrome-plated and nitrided surfaces down to 0.03 mm (0.0012 in.) thick ; metal and plastics foils ; cutting edges of cutting tools ; highly polished surfaces (sliding surfaces, gauges and gauge blocks) and the smallest lapped precision parts for mechanical and optical instruments.

The loading system is equipped with a number of weights from 300 to 10,000 grams ; an adjustable oil brake ensures a shock-free and controlled load application. The optical system is by Wetzlar and includes a microscope with inclined vision, illuminated field and interchangeable objective lenses giving magnifications of 1000x, 400x and 200x. The micro-measuring device gives readings of 0.001 mm and can be read down to 0.0005 mm.

With this optical system, the smallest indentations are sharply defined and can be evaluated rapidly and conveniently.

Photographic equipment can be fitted when a test needs to be recorded.

A number of extras are available to increase the usefulness of the instrument.

Other instruments shown by the company

included the Pentrascope and the Indentometer (IDR pp 73/74 Apr. 1961).

The 'Elcotector' is an instrument with a number of uses; besides being able to compare the degree of hardness of steel components, it will detect surface cracks in metal, differentiate between various types of alloys, measure any type of coating—metallic or otherwise—on a ferrous base, and carry out a number of other duties.

All measuring is carried out in a non-destructive manner.

The unit is fully portable, being battery operated, and can be used anywhere in the factory or workshop.

The 'Elcotector' Mk. II Micro-Gauge and Comparator, to give it its full title (Fig. 2), is a new development of the use of the Eddy Current principle. It makes use of the fact that the electrical characteristics of a coil are influenced in proportion to its proximity to a metal surface. Under suitable conditions a meter is capable of translating these changes in the coil into measurement of non-metallic coating on metal. This coil is also influenced by the type and structure of metal, thus, these changes can be translated into metal film thickness, metal hardness and like measurements.

The coil is fitted into the head of a probe ; there are two types of these, a short pencil-like one for general purposes and a small head on an

Fig. 3.

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angular extension for use in narrow, confined spaces.

The sensitivity of the instrument varies according to the type of work and can be adjusted at will over very wide limits to give very accurate readings.

The ' Elcometer ' thickness gauge (Fig. 3) is a pocket-sized precision instrument for quickly and accurately gauging the thickness of all non-magnetic coatings on iron and steel bases, the thickness being read from the scale, which is in both English and metric.

When a thickness is being gauged two contact spheres at the base of the instrument are placed on the component and a reading taken from the scale.

This instrument incorporates a powerful permanent magnet ; magnetic flux across an air gap in the instrument varies according to the proximity of a ferrous surface to the contact spheres and influences an armature in the air gap—a dial needle fitted to the armature gives the reading on the scale at the top of the unit.

Both the Elcotector and Elcometer were shown by East Lancashire Chemical Co. Ltd., of Fairfield, Manchester.

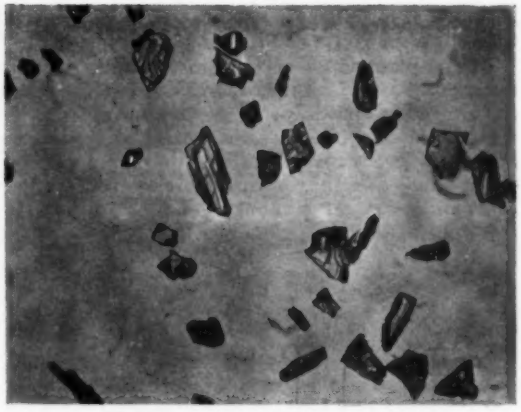


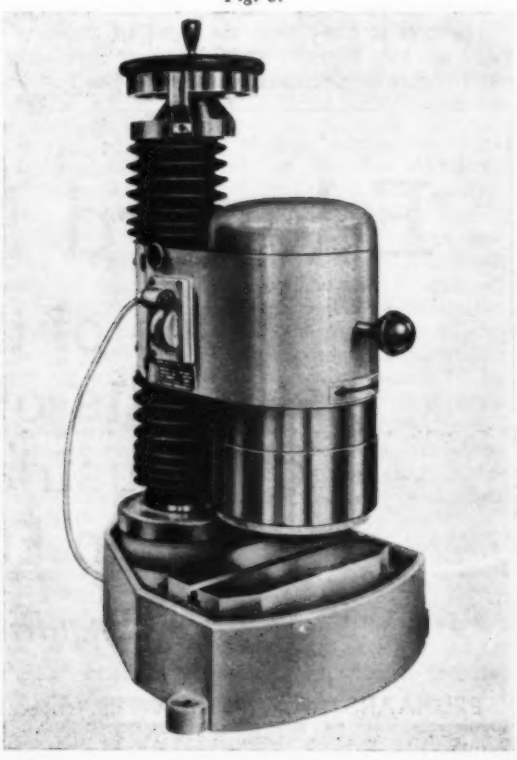
Fig. 4. Diamond grains magnified 2000 ×.

The Projectina 4014 micro-measuring instrument, manufactured by Projectina-Optical Works, Altstaetten IX, Switzerland, is distributed in the UK by R. G. Macfarlane, of 8 Montgomerie Terrace, Skelmorlie, Ayrshire.

It is a projection instrument and has the means for magnifying the component being viewed from

Fig. 5.

Fig. 6.



7x to 2000x ; by fitting a graduated ground glass screen it has been used for measuring and counting the finest diamond grains. (Fig. 4).

Built-in illumination provides for both front and back projection and also gives the necessary light for viewing the component or specimen by microscope. A photographic attachment can be fitted in place of the glass screen if a permanent record is required. Fig 5 shows the instrument.

The H. G. Stevens Company Limited, 16 Coverdale Road, London N.W.2 were showing a small hand operated bench-type precision surface grinder. This has recently come on to the market and is known as the 'Precisa' FS 2 (Fig. 6).

It can grind surfaces up to 7¾ in. diameter and rectangular areas 6 in. by 12 in. or 4 in. by 16 in. The machine is very rigidly constructed, the main pillar being 3½ in. in diameter and the hardened grinding spindle 1½ in. diameter. It is claimed to give accuracy to 0.00025 in. All bearings and feed spindle are sealed to maintain this.

Grinding wheels can be supplied for working with a number of materials, including glass and ceramic. A built-in dressing attachment with dressing diamond is fitted on the right hand side of the machine.

Book Reviews

REVIEW OF FBI REGISTER

The 34th edition of the F.B.I. Register of British Manufacturers—1962 continues to be the most useful reference book for buyers all over the world of goods manufactured in Britain.

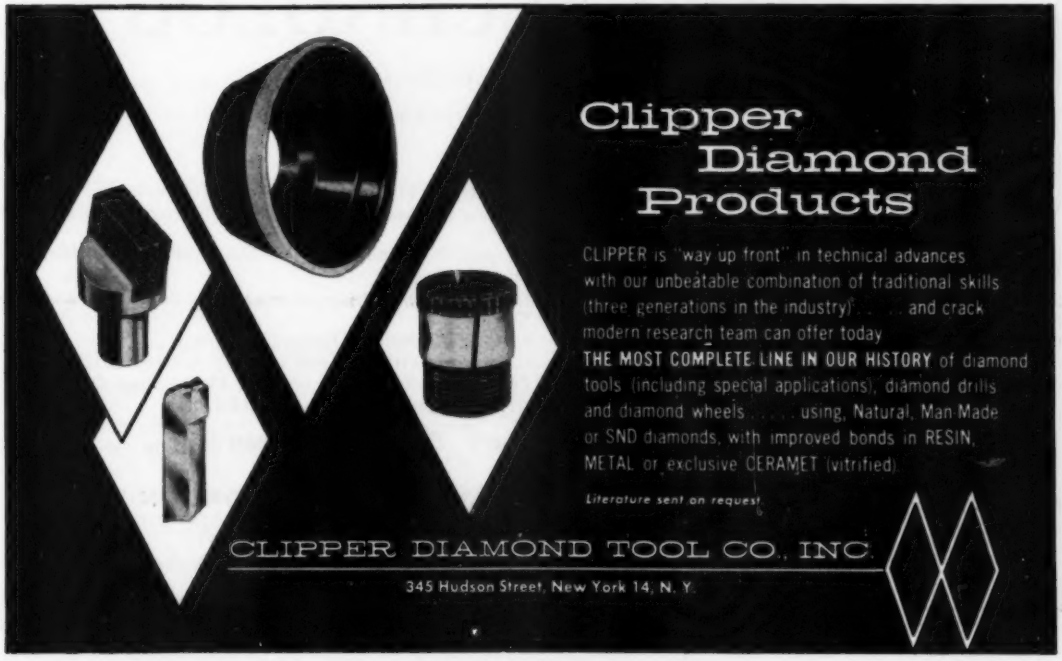
The Register is comprehensive covering a substantial cross section of British Industry. It lists 8,000 member firms, their full addresses and their range of production and includes every leading manufacturer in its field of industry together with many Trade Names, Trade Marks and the Trade Associations.

The French, German and Spanish glossaries give translations and cross reference to every product term used in the important main section —the Buyers Guide. This undoubtedly will assist foreign buyers in their quest for British made goods.

A Hole in the Bottom of the Sea

The story of the Mohole project by Williard Bascom—Weidenfeld and Nicholson, 25s

The year 1961 may well prove to be a memorable one when the progress of our knowledge of the universe is viewed in retrospect at the turn of the century. Early this year the drilling barge *Cuss I* demonstrated that it was possible to drill holes in the floor of the deep oceans—and cores up to 600 feet long were collected from the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sea-bed sediments. These experiments, which took place in the Pacific Ocean off Guadalupe Island, were the feasibility trials of project Mohole.

The object of the mohole is to obtain a sample of the mantle, the inside body of the earth which lies below the crustal rocks that form our world. The crust is aboot 20 miles thick under the Continents, but on the floor of the deep oceans the crust thins to about four miles. Since oil companies have already drilled to depths of nearly five miles on land, penetration of the sea-bed crust is within the realms of possibility. The only difficulty is to operate from a ship which is floating in the open ocean where the water is three miles deep.

Bill Bascom was the leader of the Mohole project, and his fascinating account of the past few years' activities shows how a suitable method of solving the problem of deep ocean drilling was devised. What is just as interesting is the description of how Gordon Hill and his American Miscellaneous Society's committee worked successfully to change the views of the other scientists from scepticism to whole-hearted support.

But why do the oceanographers want to collect a sample of the mantle ? It is of course, in the first instance, scientific curiosity. We are endeavouring to find what the moon is made of when we are exploring upwards. Why not downwards as well ? Jules Verne's Professor Liedenbrock had a word to say on this :— Neither you nor anyone else knows for certain what goes on in the interior of the globe considering that we are familiar with scarcely a twelve-thousandth part of its radius. My answer is that science can always be improved and that every new theory is always overthrown by a newer one. There are other more practical reasons—for example—a knowledge of the radioactive content of the inside of the earth will help our understanding of past geological activity which may well be connected with the heating up of the earth. Explanations of these things—written for those who have no scientific background—are to be found in ' A Hole in the Bottom of the Sea'.

No-one knows what the mantle rock will look like. Many geologists have made their guesses—based on the kind or rock that one finds extruded to the earth's surface. The fact that great pressures and high temperatures exist have suggested to some experts that diamonds may be found in the upper part of the mantle. It is more probable, however, that more diamonds will be used in drilling the Mohole than will be discovered. A large part of the boring will be in hard basalt, for which the diamond drill is

DIAMOND TECHNOLOGY

by Paul Grodzinski

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CHAPTERS

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specially adapted. The only direct contribution —apart from a great deal of moral support and advice—that has come from Britain on the project, was a gift by the Diamond Corporation of enough stones to make the drilling crowns which were so successful in the proving trials in the Pacific.

It will not be long before more news of the Mohole will appear. Already tenders are in from nearly a dozen firms who are bidding for the full-scale job. This will entail selecting a site, adapting a larger craft than *Cuss I* which was used in the first experiments, and then going out to sea to drill for months, maybe years, in face of possible bad weather and all the other difficulties that nature provides to challenge the oceanographer. When you read of the progress of Mohole it will add to your interest and understanding if you have Bill Bascom's excellent book beside you.

News from Abroad

The Mineral Development Corporation of India has prepared two project reports for the exploitation of the diamond deposits of the Majhgawan and Ramkherya areas in the Panna district of Madhya Pradesh.

The Majhgawan scheme will cost an estimated £675,000 with a foreign exchange component of £195,000. The annual production of diamonds is estimated at 30,000 ratties.

The Ramherya project is estimated to cost £345,000 with a foreign exchange component of £155,925, and the annual output of stones will be an estimated 12,500 ratties.

Attempted thefts at the Williamson diamond mine in Tanganyika have been greatly reduced by the use of well-trained guard dogs—mainly Dobermans and Alsations—that regularly patrol the 17 miles of fencing that surround the mine.

According to "Commonwealth Today", brought out by the Central Office of Information, gangs of from 30 to 50 men raided the mine every night, about two years ago, but attempts are now fewer and are usually undertaken by from 3 to 6 men. All the dog handlers are Africans.

It is planned to drill a 6,000 ft well at Spirit Hill, in the Bonaparte Gulf, Western Australia, permit as soon as convenient after the 1962 wet season, probably in March, according to the latest annual report of Westralian Oil Ltd.

A three-months seismic programme has indicated a closed structure at Spirit Hill, and the first diamond drill hole did not reach the potential oil-bearing devonian strata.

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A New Look for I.D.R.

This illustration is to give readers some idea what the January issue of Industrial Diamond Review will look like, although we cannot reproduce the colour here. In this instance the cover picture is related to the article "Diamond Machining of Non-Ferrous Metals."

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USSR Make Synthetic Diamonds

Ukrainian experts have worked out, for the first time in the USSR, the technology of the experimental industrial manufacture of artificial diamonds.

Two thousand carats of artificial diamonds were produced on the occasion of the 22nd Congress of the C.P.S.U., and the plan for 1961 has been overfulfilled four-fold.

The artificial stones were manufactured at the Ukrainian research institute of synthetic superhard materials and instruments.

Institute director Valentin Bakul has stated that comparative endurance tests of diamond polishing disks made at the institute showed the synthetic diamonds to be 40% harder than the natural ones.

The synthetic diamond industry will reportedly meet all the requirements of industry in the USSR in the near future.

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Obituary

John S. Morton, Director of Engis Equipment Company, Chicago, died suddenly on October 12, 1961, after a successful minor operation. Mr. Morton was born and educated in Germany and resided in the United States for more than thirty years.

The necessity of producing ultra-fine finishes on precision gimbals bearings at the beginning of World War II, led Morton to the invention of diamond compounds which had to satisfy the most stringent requirements of stability, durability, and precise repetitive performance. His inventions have received recognition as major accomplishments for the better production of fine surfaces throughout the industry of the world. They have become a very important factor in utilizing of fine diamond dust for new purposes and in the great variety of applications have aided the metal, ceramic and plastic industries.

Mr. Morton has been associated with Engis Equipment Company as Chief Chemist in charge of Research and Development and the production of Hyprez Diamond Compounds for twenty years.

His wife, Caroline L. Morton, has been and continues to be Treasurer of Engis Equipment Company.

The late John S. Morton.

New Equipment

New Substitute Weighing, One-pan Diamond Balance

Production of a special diamond weighing balance has been announced by Wm. Ainsworth & Sons, Inc, Denver, Colorado, USA. This new unit is a modification of the company's Right-A-Weigh one-pan, analytical balance, introduced seven years ago, to incorporate calibration

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in carats. It is available for capacities of either 200 or 1000 carats.

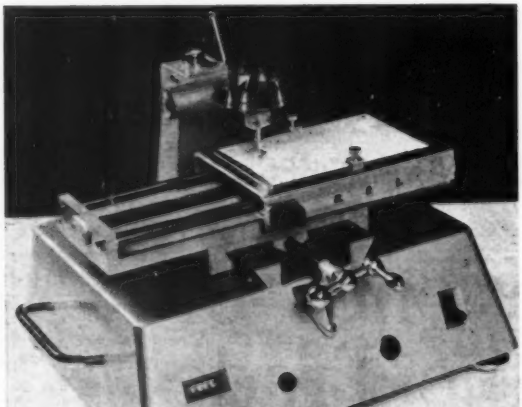
The principal features of this balance are claimed to be its accuracy, ease of use, speed, and long-time economy. All weights are built into the balance and are operated by knobs on the front of the case, eliminating all handling of weights. The knobs also operate the counters and the total of weights employed are shown on an eye-level, in-line, unobstructed readout on front of case. Weighing procedure is simply to load the pan, dial the weights and read results.

The balance uses the accurate substitution method of weighing ; and with a constant load on the beam, the balance has the same sensitivity regardless of the load on the pan. Constant sensitivity, plus accurate weights made of high chrome-nickel stainless steel, sapphire bearings, a gimbal suspension for the pan, beam compensated for changes in atmospheric pressure, all combine to assure maximum accuracy.

Ainsworth also has available its standard two-pan chainweight balance calibrated in carats, with a capacity of 200 carats.

Diamond Scratch Tester in Demand

The M.P.L. scratch tester, shown here, is an elegant precision instrument for testing the comparative scratch resistance of various materials and finishes by means of a diamond scriber.



The test specimen is clamped on to the traverse table and the scriber arm, loaded with the appropriate weights, is lowered on to the sample. Table traverse is set in motion by depressing a button switch governing a motorized gear unit. A limit switch stops the table at the end of its traverse and, by lifting the scriber arm and pressing the clutch button, the table is returned to its original position. The sample can be adjusted laterally by means of a graduated handwheel in order to make parallel scratch tests, and a counter is incorporated in the body of the machine to record the number of tests made.

Choice of the correct diamond scriber for each machine is governed by the nature of the material to be examined, and the traverse table also can be supplied to suit individual requirements.

The manufacturers report a heavy demand for this machine and delivery is consequently two to three months.

Note—Mfr.: Metal Porcelains Ltd., Cornwall Rd., Smethwick 40, Staffs.

Two New Lapping Machines

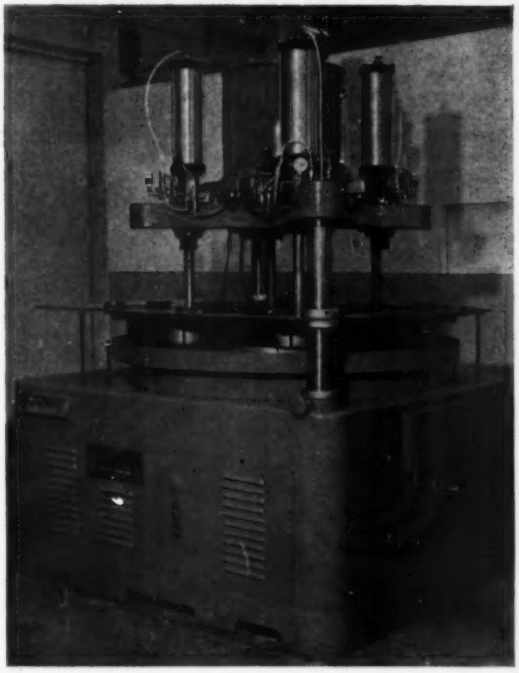
The new 72 in. ' Lapmaster ' lapping machine, now being marketed in Britain and on the European continent by Payne Products International Limited, Buckingham Avenue, Trade Estate, Slough, is claimed to be the largest in Europe. It is American built and has considerable potential in the motor car industry for lapping large engine castings. It is said virtually to eliminate machining and grinding operations previously used to mate up cylinder blocks and heads ; also, by working to a datum line, it has been found possible, after lapping, to carry out all subsequent machining with castings separate and not bolted together as hitherto.

The segmented lapping plate has an outside diameter of 72 in. and an inside diameter of 18 in., giving a lapping surface 27½ in. wide. Four conditioning rings, each with an outside diameter of 30 in. and an inside diameter of 27½ in. keep the lapping surface true. These rings are rotated during the lapping cycle to condition the plate continuously ; guides at the side position the rings, which can be adjusted to give a concave, convex or dead square surface to the plate according to the requirements of the work being lapped.

All work is placed inside the rings and can comprise a variety of components ; the rings can be removed if a casting, having a maximum dimension over 27½ in. but under 52 in. has to be lapped.

Lapping compound and vehicle are mixed in a tank fitted to the machine by a ½ hp agitator motor and fed to the surface of the plate in any desired quantity. The lapping plate is driven by a 20 hp motor and has a speed of 42 rev/minute.

The total height of the machine is 74 in., the working height 34 in. It is 78 in. wide and



The British designed and built 48 inch Lapmaster.

135 in. long and is powered from a 440 v, 50 cycle/3 phase AC supply.

The new improved 48 in. ' Lapmaster ' lapping machine is of British design and manufacture and takes up considerably less floor space than the original 48 in. model. The mounting of the abrasive tank and agitator motor above the working parts of the machine makes the lapping plate accessible from all directions. A further refinement is the provision of multiple abrasive feeds to the lapping plate ensuring an even distribution over the entire surface of the plate.

The plate has an outside diameter of 48 in. and an inside diameter of 13 in. and is equipped with four conditioning rings, each having an outside diameter of 20 in., and an inside diameter of 17 in. There are four pneumatic lifts over the rings, which can lift the rings from the plate or apply a pressure plate to the work being lapped.

An automatic timing clock is incorporated to time the lapping cycle ; at the end of a predetermined time the lapping operation is automatically stopped and the abrasive flow cut off.

New Drill Cuts Hardest Metal

A new type of drill which will cut the hardest metal or other materials at very high speeds is now being marketed in Britain.

It comprises a tungsten carbide tip brazed into a hollow stainless steel shank with shallow, unrelieved spiral flutes, similar to those on a twist drill, machined around it. The end of the shank is milled and slotted to receive the tip, which is circular ground and pointed after brazing.

New principles include a negative rake angle and slight back taper ground on the tip circle; for most work the drill point is ground with an included angle of 120° nominal. The result of the negative rake is a swarf composed of small coarse particles.

Coolant is pressure fed consistently through the shank at 85 p.s.i. and discharged through two edges remain cool. Cutting speeds are high, above 200 f.p.m., except for a few materials.

The drills are manufactured by Horstman Limited, of James Street, Bath, and sold by Coldpoint Limited, of St. James Street, London, S.W. 1.

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ALTHOUGH NEXT MONTH you will find that the make-up of *INDUSTRIAL DIAMOND REVIEW* has changed, remember all the latest comment and gossip of the Diamond Trade still appears in 'Habit News', available free from Habit Diamond Tooling Limited, Lurgan Avenue, London, W.6. Ask to be put on the mailing list.

TO ALL THOSE who, in the past, have been connected with the preparation and publishing of *INDUSTRIAL DIAMOND REVIEW*, Habit wishes to express its gratitude for their co-operation and guidance.

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Contributions of scientific, technical and practical interests and news items are invited, but responsibility cannot be accepted for the safety of MSS, drawings, photographs or other matter submitted. Unaccepted matter will be returned.

INDUSTRIAL DIAMOND ABSTRACTS

Industrial Diamond Information Bureau,
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Telephone : FLEet Street 1577

1961 Volume 18
DECEMBER

The Shape of Things to Come

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DIAMOND MINING AND INDUSTRY

Prospecting in North Yakutia

Anon. *Industr Diam Rev* 1961 Vol 21 (247) p 117 (June)

More than 3,800 sq miles in the basin of the River Birekte are being prospected for diamonds. Developments expected during the next few years in diamond production in Yakutia are outlined.

G *Ebe.12.332*

The diamond deposits of Iakutiia

V. S. Sokolev. *Canad Min J* 1961 Vol 82 (1) pp 35-36 (Jan) (Abstr in English, original in Russian)

An abstract from the book by Bobriyevich.

B *Eb.332*

Planning in Ghana

Anon. *Industr Diam Rev* 1961 Vol 21 (246) p 99 (May)

Refers to the work of the Geological Survey Department in Accra which is said to have discovered, among other things, the diamond fields of the Birim Valley and those near Tarkwa.

G *Ebe.12.367*

Success of the diamond industry in Israel

Anon. *Industr Diam Rev* 1961 Vol 21 (243) pp 33-34 (Feb)

The economic growth of Israel's diamond industry since 1958 is described. *D* *F.25.351*

Screenings . . . diamonds and bauxite

Anon. *Mine & Quarry Engng* 1961 Vol 27 (3) p 113 (Mar)

It is stated that the Diamond Corporation has agreed to assist the Sierra Leone Government's Mining & Geological Departments in prospecting in different parts of the country, and any diamonds recovered during prospecting or working will be sold through the Government Diamond Office with a refund to the Corporation of it's expenses.

D *F.12.3672*

Economic aspects of interruption of diamond production in Congo Republic

A. F. Daily. *Min Engng* 1961 Vol 13 (5) pp 475-479 (May)

6 illustr, 1 table. *B* *F.13.365*

PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF DIAMOND

Etch figures on alum and the diamond pattern

M. Omar, T. H. Youssef (Nat Res Centre, Cairo, Egypt). *Phil Mag, Lond* 1961 Vol 6 (66) pp 791-794 (June)

Potash alum crystals grown from solution had fine octahedron faces. They were etched by a quick dip in water. The etch figures obtained were not only similar in orientation and appearance to natural growth figures on diamond, but were identical with them in every respect. It is concluded that diamond is not characterised by a special growth pattern and that in fact all figures naturally obtained on diamond are a result of natural dissolution. 7 figs, 10 ref.

D *Bcz Ubb*F Ubb*

Some observations on the morphology and physical characteristics of synthetic diamond

H. P. Bovenkerk. *Amer Min* 1961 Vol 46 (7/8) pp 952-963 (July-Aug)

The growth of diamond in the laboratory has made possible investigations of the crystal habit, colour, and surface structure as related to variations in the growth process. Many of the variations found in natural diamond have been reproduced. The preferred growing faces are the octahedral planes, with the exception of the low temperature cube forms, which grow on the cube face. 10 illustr, 5 ref.

D *Fh Ub*

Astroblemes

R. S. Dietz. *Sci Amer* 1961 Vol 205 (2) pp 51-58 (July)

Astroblemes are the craters caused by the impact of large meteorites. The evidence for such impacts is, it is claimed, largely the high pressure mineral coesite and 'shatter cones' in the rocks. The occurrence of coesite and diamond in some craters is mentioned.

D *Bntb F.12*

Micro-disk patterns on diamond dodecahedra

D. C. Pandeya, S. Tolansky. *Proc phys Soc, Lond* 1961 Vol 78 Pt 1 (499) pp 12-16 (July)

7 ref. *B* *Fdn Ub*

Soviet diamonds

B. O. Gavrusevich, T. M. Agafonova. *Nauka i zhyttia* 1960 Vol 10 (12) pp 14-16 (Dec); *Library of Congress Mthly Index Russ Access* 1961 Vol 14 (4) p 944 (July) (Original in Ukrainian)

D *F.33*

A good look at the design, use, and care of diamond cutting tools

J. Taeyaerts. *Industr Diam Rev* 1961 Vol 21 (243) pp 6-12 (Jan)

Although diamond is the hardest substance known to man, which makes it the ideal cutting tool material, its atomic structure is such that it can easily be cleaved along a cleavage plane. This fact makes it necessary for great care to be taken over the tool geometry for a particular application. Several practical examples are illustrated. 15 illustr. *D* *Nf.21*

PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF HARD MATERIALS

Chromium carbide in cemented carbides type WC-Co

Z. Crha. *Hutn List* 1961 Vol 16 (6) pp 421-423 (June) (In Czech)

Increased hardness and resistance to oxidation at high temperatures are among the advantages claimed for the addition of chromium carbide, also greater uniformity of grains throughout the main component of WC. 8 ref, 8 illustr. *D* *Rhz U*

Investigation of several hard alloys of the system boron-silicon-carbon

G. A. Meerson, V. S. Dergunova, V. A. Epel'baum, M. A. Gurevich (Moscow). *Izvestiya Akademii Nauk SSSR, OPT Metallurgiya i Toplivo* 1961 (4) pp 90-94 (July-Aug) (In Russian)

D *Sbdz.21*

What do glasses and ceramics offer the design engineer ?
J. R. Blizard (Techn Prod Div, Corning Glass Works, Corning, NY). *Design News* 1961 Vol 16 (15) pp 82-87 (July 21)

The chemical and physical properties of ceramics, glasses, glass ceramics and other materials, including silicon carbide, which make them suitable for specific applications, are described. 4 figs, 2 tables.

D *Bkcz U/Bl U/Bm U*

Hardened particles increase alloy's tool resistance
E. J. Stefanides (Diebold Inc, Canton, Ohio). *Design News* 1961 Vol 16 (11) pp 64-65 (May 22)

An ultra-hard material, Infusite, used in the construction of safes, is said to be able to resist pressure-applied carbide cutting tools and 'torches'. 2 figs, 1 illustr.

D *Baz Ceg Pdc Vcb*

Teflon and sapphire cell for optical absorption studies under high pressure
S. J. Gill, W. D. Rummel (Dep of Chemistry, University of Colorado). *Rev Sci Instrum* 1961 Vol 32 (6) p 752 (June)

The half-inch cylindrical sapphire windows used in the cell were supplied by the Linde Co, Division of Union Carbide Corporation. 2 figs, 3 ref.

D *Bbd Tz Ukz.21*

Cemented borides have potential for future cutting tools
R. C. Brewer. *Commonw Eng* 1960 Vol 48 pp 49-50 (Aug); *J iron st Inst* 1961 Vol 198 Pt 1 p 97 (May) (Abstr)

D *Pd Rfbz.132*

Field applications of abrasive-jetting techniques
R. S. Ousterhout. *J Petrol Tech* 1961 Vol 13 (5) pp 413-415 (May)

Interest in abrasive-jetting techniques has increased since the development of jet orifice nozzles of extremely hard materials having a working life of more than three hours. Several case histories are presented in this paper to illustrate applications and performance of abrasive-jetting. 8 illustr, 11 tables.

D *Ba Chmz Psz*

DIAMOND, ETC, IN INSTRUMENTS

FP 1,240,395 **NV Philips' Gloeilampenfabrieken**
(Nov 14, 1958—Netherlands)

Method of diamond bonding. Procédé de soudage sur du diamant

In the production of tools, such as drills and chisels or of gramophone styli, diamonds are mounted on a support by applying a layer of titanium powder from a suspension on to the diamond and brazing the diamond to the support in an inert atmosphere or a vacuum with silver, copper, or a silver-copper alloy. The diamond may be roughened before application of the powder by heating in air. 2 claims.

H *F Lfd N.545*

FP 1,240,396 **NV Philips' Gloeilampenfabrieken**
(Nov 15, 1958—Netherlands)

Article utilising a diamond, particularly a diamond gramophone needle, and its method of manufacture. Objet pourvu d'un diamant, en particulier aiguille de phonographe en diamant, et son procédé de fabrication

In the manufacture of gramophone needles, considerable saving is effected by using diamond splinters or rods of very small dimensions and securing them to a metal rod, the assembly being easily handled and mounted. The method consists of introducing the diamond in a helical metal spring, closed at one end, inserting a metal rod at the open end to make contact with the diamond, immersing the diamond containing portion of the spring in molten solder, removing the closed end of the spring, after cooling, by grinding and shaping the thus exposed part of the diamond by grinding and polishing. The metal rod and the spring which may be of molybdenum or tungsten are joined by spot welding. The solder may be an alloy of copper, silver and titanium. 7 claims, 5 illustr.

H *Nfs Qc.545*

DAS 1,101,998 (Dec 27, 1957—USA) **R. J. Bondley, General Electric Co**

Method of making gramophone needles. Verfahren zur Herstellung von Tonabnehmernadeln

Needles with a diamond point have many advantages but the cheaper irregularly formed diamonds are difficu't to secure on the needle shafts and this leads to a high percentage of scrap and breakage during grinding. The production problem has been solved by first grinding a cone on the diamond, setting the conical portion of the diamond in a conical recess of the needle shaft and fixing it, *eg* by soldering, finally grinding the projecting end to a conical point. The four stages of

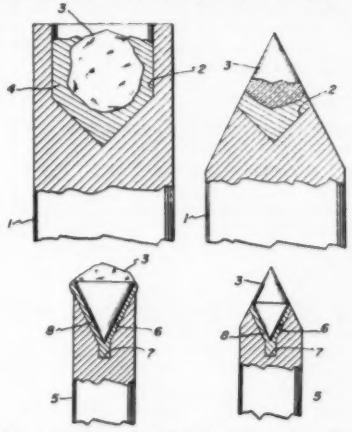


Fig 2 and 3 (top) and 4 and 5 (bottom). DAS 1,101,998.

the method are illustrated in Figs 2 to 5. In Fig 2 is an auxiliary holder (iron or molybdenum) with diamond 3 fixed in recess 2 by solder 4 using *eg* a paste of titanium hydride in a volatile solvent as a coating and silver or a silver-lead alloy as the solder, the assembly being heated *in vacuo*. The ground and lapped diamond is then removed by heating and the conical part set in needle shaft 5 in conical recess 6 with end recess 7 containing the solder, the final shaping is effected on a diamond lap to obtain a point with a radius of 0.025 mm. 1 claim, 5 illustr. Ref cited : 2 DBP ; 1 Austrian P ; 1 Swiss P ; 1 periodical 1956.

J *Chc Pr:Ne.545/Chc Pr:Tdb.545*

LITERATURE REQUESTS
ease quote the page number of the journal which contains P'e original reference, and the author and title of the article, thall cases.

HARDNESS, WEAR TESTING, AND PRECISION GAUGING

A new universal surface testing device on the pneumatic principle, suitable for all surface shapes. Eine neuartige, universal für alle Oberflächenformen andwendbare Oberflächenprüfvorrichtung auf pneumatischer Grundlage

H. Voigt. *Feinw Tech* 1961 Vol 65 (9) pp 344-348 (Sep) (In German)

The state of pneumatic surface testing, the deficiencies and disadvantages of the process are reviewed. A new pneumatic surface testing device is described, capable of dealing with flat, cylindrical or spherical forms, outer and inner surfaces. The method of comparison is independent of the kind of material or method of production used. 5 illustr, 13 ref.

B *Vs Wj*

Indentors of high heat resistance for hardness tests on metals up to 1300° C in vacuo

M. G. Lozinskii, M. B. Guterman. *Zavodsk Lab* 1956 Vol 22 (11) pp 1358-1363 ; *NLL Transl Bull* 1961 Vol 3 (10) p 888 (Oct) (Original in Russian)

D *Cv Tdc*

Automatic control of dimensional accuracy in internal grinding

Hua Ch'ang-Ken. *Measurement Tech* 1960 (9) pp 735-738 (Sep) ; *Instrum Abstr* 1961 Vol 16 (8) p 653 (Aug)

Factors limiting the precision of automatic dimensional control in grinding are considered.

D *Chcn Pr Wpz*

Built-in optical instruments for machine tools. Einbauoptik für Werkzeugmaschinen

A. Metz. *Industrieblatt* 1961 Vol 61 (8) pp 517-520 (Aug) (In German)

The article discusses the uses of magnifying lenses, microscopes, telescopes and projection equipment on machine tools as an aid to greater accuracy.

B *Pr Wc*

Instruction 235-56 on the verification of instruments for the determination of metal hardness

Komitet standartov, mer i izmeritel'nykh priborov. *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (11) p 3482 (Feb) (In Russian)

Book, Izd ofitsial'noe, Moscow, 1959, 55 pp.

[Not in library of Industrial Diamond Information Bureau].

D *Wgh.52*

7th European Machine Tool Exhibition—Brussels : OMT roundness measuring machine

Optical Measuring Tools Ltd, 142 Bridge Rd, Maidenhead, Berks. *Machinery, Lond* 1961 Vol 99 (2546) pp 469-470 (Aug 30)

With this instrument, bores from ¼ in. to 6 in., and external diameters from 1/16 in. to 6 in. can, it is claimed, be checked to within 0.00001 in. for roundness. 1 illustr.

D *Unfz Vfd W.27.3235*

Hardness tester checks complicated contours

Radio Corporation of America, Industrial and Automation Div, 12605 Arnold, Detroit, Mich. *Tool mfg Engr* 1961 Vol 47 (3) p 157 (Sep)

This portable instrument can be used for testing large and small parts, steel and soft metals whose thickness is more than 0.6 mm. Readings are in both Vickers and Rockwell units. 1 illustr.

D *Wghc*

Microscope detects, measures die wear

Bausch & Lomb Inc, Rochester 2, NY. *Tool mfg Engr* 1961 Vol 47 (3) p 139 (Sep)

The Die-Wear microscope is said to be capable of measuring die wear over a range of 0.020 in. to an accuracy of ±0.0005 in. or 10% of depth, whichever is greater. The exact amount of metal to be removed to resharpen properly the cutting edge of metal dies may, it is claimed, be simply determined with this instrument. 1 illustr.

D *Ax Cw Wcm*

Adapter measures sharpness of cutting edges

Brush Instruments, Div of Clevite Corp, 37th and Perkins, Cleveland 14, Ohio. *Cutting Tool Engng* 1961 Vol 13 (9) p 35 (Sep)

A new adapter for the Surfindicator has a chisel point which permits surface measurements of cutting edges, knife edges and components with very small outside diameters.

B *Pd Uqb Vfd W*

X-ray non-contact gauges

Daystrom Ltd, Weston Instruments Co Div, Gloucester. *Brit engng-transp* 1961 Vol 43 (11) p 367 (June)

Describes XactRAY, a gauge designed primarily for use with rolled or extruded products and which is said to be suitable for a wide variety of materials. Five models of the gauge give a range from 0.00035 in. to 2 in., and accuracy is claimed to be better than ±1% of the thickness being measured, or to special order ±0.5%. 1 illustr.

D *Tz Ur Wbb*

Optical device eliminates gage blocks, master setups

Bausch & Lomb Inc, Rochester 2, NY. *Tool mfg Engr* 1961 Vol 47 (3) p 149 (Sep)

The outstanding features claimed for the DR-25B optical gauge are : accuracy to 0.000025 in. ; operation in the 50 to 90° F range without temperature correction tables ; measurement of parts directly, thereby eliminating gauge blocks ; also parts may be checked which have several dimensions within a range of zero to 3 inches. 1 illustr.

D *Wbb*

Application of the 'total replica' technique to the detection of defects on inner pipe surfaces. Application de la technique de 'réplique totale' à la détection de défauts sur la surface intérieure des tubes

L. Alfille, N. Azam, M. Fignon. *Rev Metall* 1961 Vol 58 (5) pp 429-436 (May) (In French)

Review of methods of non-destructive examination. A method using the total replica technique is described. The replica of the entire inner surface is obtained by means of pre-vulcanized rubber solution. Possible extensions of this process to production run checking are mentioned. The quality of the replica thus obtained is illustrated by some typical examples (cross wires, Knoop hardness indentations, etch pits and induced scratch marks). 10 illustr.

B *Ag Cz Unf.193:.1456*

Hardness testers

Anon. ICS Briefs (Webster Instrument Inc). *Instrum & Control Syst* 1961 Vol 34 (6) p 1029 (June)

Webster hardness testers vary either in penetrator design or in the load spring itself, by which they can be adapted to testing a wide range of hardnesses and metals. 1 illustr.

D *Bf Cvd Wghc*

Determination of the hardness of plastic materials by means of Rockwell and Brinell model testers

V. I. Egiz. *Plast massy* 1961 (4) pp 57-61 ; *Library of Congress Mthly Index Russ Access* 1961 Vol 14 (4) p 978 (July) (In Russian)

D *Bp Cv Wgh*

Microhardness of Kerch sinter

N. A. Vasyutinskii. *Stal* 1961 (2) pp 105-106 ; *J Iron St Inst* 1961 Vol 198 (3) p 304 (July)

There is a tendency for sinter to crumble in storage, which is apparently caused by internal stresses arising from the large variety of components forming micro-regions. An amorphous cement seems to be formed by rapid cooling, and this is highly strained. This is the case in fluxed and unfluxed sinters alike. Diamond tester imprints were used, and the impressions tended to lose their shape either at once, or after short delay, tending to a circular form.

B *Bz Cv Nd*

Roughness control with 'Comparex'. Contrôle de rugosité avec 'Comparex'

Ets Lat, 20 bis Rue de l'Hotel-de-Ville, Neuilly-sur-Seine, France. *Metallurg constr mécan* 1961 Vol 93 (7) p 629 (July) (In French)

It is claimed that Comparex, an optical roughness control instrument on the comparison principle, may be used by non-specialised personnel on machined pieces, or during the machining. The device possesses the advantage of allowing the simultaneous comparison of different specimens with the control piece, which remains permanently in the field of vision. 2 illustr.

B *Wgf*

Electroplating to specification

P. G. L. Vivian. *Prod Finish* 1961 Vol 14 (5) pp 89-92, 118 (May)

In the section on hardness, it is stated that plated deposit hardness is now more usually expressed as diamond point number (D.P.N.) or Vickers point number (V.P.N.) A description of hardness testing using diamond indentation follows. 2 illustr.

D *Cv Nd*

Microhardness of silver deposits

S. Ramachandran, N. V. Parthasaradhy (Central Electrochemical Research Institute, Karaikudi-3, India). *Metal Finish* 1961 Vol 59 (4) pp 40-44, 60 (Apr)

The static indentation method was adopted, it is stated, employing a Vickers pyramidal diamond indentor with a vertex angle of 136°. 16 refs, 4 figs, 3 tables.

D *Bfbb Cvd Nde*

TRUING OF GRINDING WHEELS

New expendable diamond dressing tools

Diamond Tool Research Co Inc. *Industr Diam Rev* 1961 Vol 21 (243) p 30 (Feb)

• New savings and efficiencies in grinding wheel dressing are made possible, it is claimed, with the new NR series of non-resettable' and expendable diamond dressing tools. 1 illustr. *D* *Nj*

New form of grinding, cheaper, faster, closer

H. E. Robison. *Industr Diam Rev* 1961 Vol 21 (243) pp 13-16 (Jan)

See also : *Industr Diam Abstr* 1961 Vol 18 p A255 (Oct). *D* *Chc*

Application of industrial diamonds IV : Dressing diamonds for grinding wheels

H. J. Otterloo. *Industr Diam Rev* 1961 Vol 21 (246) pp 86-90, 92-98 (May)

The factors to be considered, if highest efficiency is to be reached in the use of dressing diamonds, are discussed. The author does not consider in detail the selection of the various types of dressing diamond but confines himself to the three types relevant in practice, carbonado, ballas, and boart. A simple method of testing the hardness of diamond is described. The article is mainly concerned with the shapes of various dressing diamond holders, the mounting of the diamonds, the setting of the tools, and their correct position with respect to the grinding wheel. Some general notes on the production of these tools are included and photographs and diagrams show them at work. Advice on the care of tools is given, and the importance of correct operations stressed. 34 illustr.

G *F:Cv.1456/Nj Qc.21*

Fluidmotion wheel dressers

J & S Tool Co Inc, Livingston, N. J. *Industr Diam Rev* 1961 Vol 21 (243) p 39 (Feb)

Fluidmotion means that two angles may be dressed tangent to a radius in one continuous motion with 0.0001 in. accuracy, it is claimed, and with only one setting, the diamond automatically returning to the centre position after dressing the angles. There is a wide range of models for a variety of sizes and applications. *D* *Nj Psfc*

BP 859,767 **The Cincinnati Milling Machine Co** (Feb 26, 1959—USA)

Truing mechanism for grinding machine

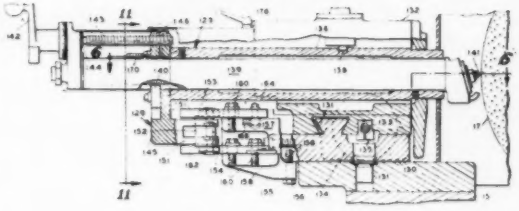


Fig 6. BP 859,767.

Arcuate surfaces are formed on the grinding or regulating wheel of a centreless grinding machine by means of a mechanism which does not include a fixed centre or a special shape cam to control the movement of the cutting element. Figs 6 and 7 illustrate the grinding wheel truing mechanism which is mounted on the grinding machine. The wheel 17 is trued by a diamond 141 carried by a bar 139 axially adjustable in a sleeve 136, which is itself axially movable, under the action of a follower 152, in a slide 132 carried by an adjustably-swivelled support plate 130. The bar 139 is adjusted manually by a lead screw 143 and the slide 132 is reciprocated by lead screw 133 and hydraulic motor 134. The bar 152 is pivoted to a clevis 151 suspended from the sleeve 136 and is sprung so that pivoted shoes 153, 154 on its ends slideably engage control surfaces 161a, 162a on guide bars 161, 162 adjustably carried by a bracket 155 on the plate 130 and set in their desired control positions by pivoting them about bolts 159 and clamping them by bolts 160. Depending on the inclination of the control surfaces 161a, 162a, different arcuate profiles are obtained. The

(continued on next page)

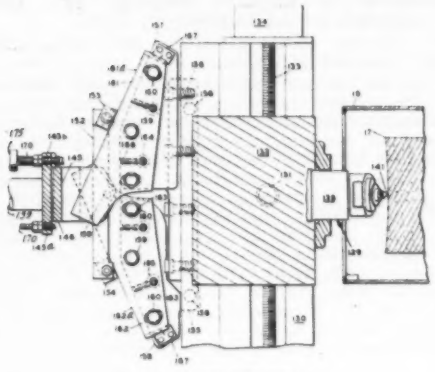


Fig 7. BP 859,767.

regulating wheel truing mechanism, also mounted on the machine, incorporates a similar arrangement. 10 claims, 14 illustr. *H* *Ab Cgf Psf.545*

BP 863,039 (Mar 15, 1961) **H. S. Hallewell**

Improvements in forming means for profile grinding wheels

A profile is formed on a grinding wheel 13, Fig 8, by means of a truing tool 25 arranged for movement with a follower 26 adapted to follow a template 45 so that the profile of the template is reproduced on the circumference of the grinding wheel. The tool 25 is carried on an arm 24 extending from one end of a spindle 22, Fig 9, which carries the follower 26 at its

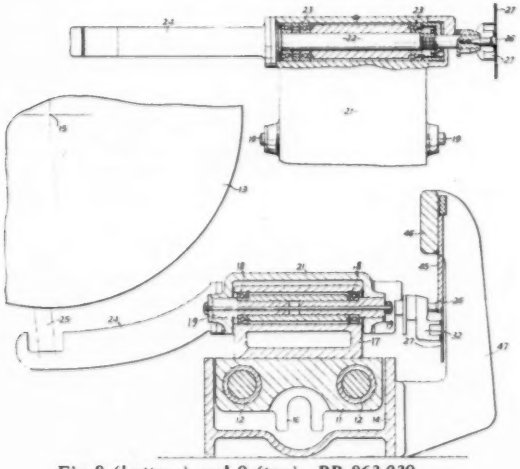


Fig 8 (bottom) and 9 (top). BP 863,039.

other end and which is mounted on one end of a lever 21 for rocking movement with respect thereto. The lever is pivoted on a slide 11 reciprocated along guides 12 by the piston rod of a hydraulic motor, the speed and direction of the motor piston being controlled by a hydraulic valve (not shown) mounted on the other end of the lever. The valve is operated by a handle which also serves to rock the valve casing, the rocking movement being transmitted by a link to the spindle 22. 3 claims, 4 illustr.

H *Abm Cgf Psf.545*

USP 2,957,471 (Nov 11, 1958—U.K.) **M. J. Kent, Precision Grinding Ltd**

Means for trimming grinding or analogous rotary bodies used in grinding or other machines

The device illustrated in Figs 10 and 11 comprises a microscope mounted on a pivot post 16 about which is pivoted an arcuate bracket 15 carrying a tool-holder 21 having an adjustable diamond tool (or tools) 24 for trimming the shaped periphery of a rotating grinding wheel 9, Fig 12. A support 5, attached to the grinding

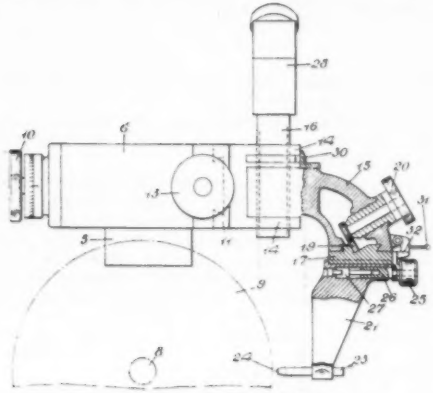


Fig 10. USP 2,957,471.

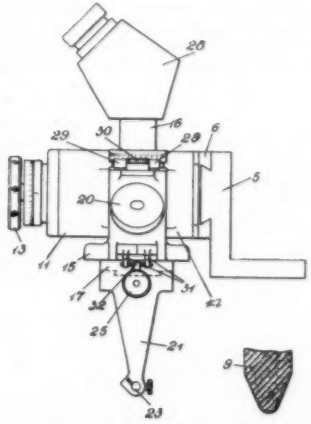


Fig 11 (left) and 12 (right). USP 2,957,471.

machine, carries a slide 6 movable at right-angles to the wheel axis 8, and a slide 11 movable parallel thereto is mounted on the slide 6. The bracket 15 is pivotally secured to the slide 11 by the post 16. The microscope 28 may be provided with a graticule for checking the trimming of the wheel. A slide 17, attached to the underside of bracket 15, is caused by a rack and pinion 19 to traverse the tool when trimming the straight flank portion of the wheel. The slide is locked in its central position by locking members 31, when the tool is required to act on the curved portion of the wheel periphery, the tool-holder being carried by a sub-slide to permit radial adjustment of the tool. The device may be used to trim rotary electrodes for spark-erosion machines. 2 claims, 5 illustr. Ref cited : 4 USP ; 1 BP.

H *Chc Pr Psfz.545*

USP 2,968,135 (Apr 7, 1958) **S. A. Boettcher, J. C. Page, Abrading Systems Co**

Lapping machine

The surface of a lapping wheel tends to wear unevenly. Truing rings therefore require controlled rotation in order to correct the unevenness of the surface. Control is effected by braking means interposed between the fixed vertical spindle and the weight plate providing pressure on the workpieces, so that the rotational velocity of the truing ring or rings can be selectively adjusted independently of the downward pressure on the lapping surface. 7 claims, 4 illustr. Ref cited: 2 USP. *J* *Chd Pr Psf.545*

PRECISION MACHINING OF METALS

A review of advantages of high speed machining of light metals : great efficiencies are relatively unexploited

Anon. *Light Metal Age* 1961 p 9 (Apr)

B *Bfv Ceq Uqfb*

Machining materials at 3600 km/h. Materialbearbeitung mit 3600 km/h

M. Kronenberg. *Werkstattstechnik* 1961 Vol 51 (3) p 133 (Mar) (In German); *Umschau* 1961 Vol 61 (16) p 506 (Aug 15) (In German)

B *B Ceq Uqf*

High speed shaver

Anon. *Ceram Age* 1961 Vol 77 (7) p 8 (July)

A new German high speed machine can, it is claimed, make cuts as much as 1/16 in. in metal rods to remove surface imperfections and other impurities. It incorporates tungsten carbide knives in multiple cutters operating at 8000 rev/min. Thus, it is stated, ceramic rods and tubing could be fabricated at high speeds and to extremely close tolerances.

D *Agz Bf Ceg Pdc Pr.322/Agz Bl Ceg Pdc Pr.322*

[Diamond blade]

Dia-Chrome Inc. *Ceram Age* 1961 Vol 77 (7) p 10 (July)

A 14 in. diameter wheel band saw which takes a 7 ft 7 in. long diamond blade is equipped for wet cutting, has four rubber tyred guide wheels to dampen out blade vibrations, and a tilting table for accurate angle cutting. There is a choice of variable speed 110 V DC motor, direct drive, or a constant speed 1725 rev/min motor. 1 illustr. *D* *Ceg Pr:Ng Sjk*

The precision machining of watch cases

Dennison Watch Case Co Ltd. *Industr Diam Rev* 1961 Vol 21 (243) p 38 (Feb)

Many of the operations in the manufacture of gold watch cases are carried out with diamond tools, it is stated. 1 illustr. *D* *Az Bfba Chm N*

Mass production of transistors Pt I

P. Trippe. *Mass Prod* 1961 Vol 37 (1) pp 90-97 (Jan)

The article describes the production methods developed by Mullard Ltd for the manufacture of transistors at their Southampton factory. Diamond wheels and diamond cutters are used to slice and dice the germanium metal within micron tolerances. For very small dice Duplex diamond heads are employed. 8 illustr. *B* *Az Bfr Cej N*

Milling cutters blades

Wickman Ltd, Banner Lane, Coventry. *Mach Lloyd* 1961 Vol 33 (19A) p 63 (Sep 23)

Lo-Ten blades, it is claimed, reduce the high cutting pressure, which is the fault of double-negative geometry cutters, and give easy smooth entry into the workpiece combined with a shearing action in the cut. 1 illustr.

B *Cff Pdz Uqg*

Vibration monitoring

C. R. Carkeek, (Carkeek Engng); G. L. Carter (Robertshaw Fulton Controls Co). *Instrum & Control Syst* 1961 Vol 34 (5) pp 873-875 (May)

Vibration fatigue, it is stated, is machinery's worst enemy. In the authors' opinion, destructive force can only be indicated by acceleration-sensitive pick-ups; displacement alone is a poor criterion. 2 figs, 2 illustr, 1 ref. *D* *Pr Qn Wh.1312*

Throw-away carbide and ceramic inserts for cutting tools. Explanations of the proposed Norms (July 1961). DIN 4968, Throw-away carbide inserts, and DIN 4969 Throw-away ceramic inserts. Wendeschneidplatten aus Hartmetall und Schneidkeramik. Erläuterungen zu den Norm-Entwürfen (Juli 1961) DIN 4968 Wendeschneidplatten aus Hartmetall, DIN 4968—aus Schneidkeramik

H. Nitsche. *Din Mitt* 1961 Vol 40 (7) pp 345-350 (July 15) (In German)

Numerous illustr, and tables.

B *Pdcb.255/Pddz.255*

CUTTING AND MACHINING OF STONE, GLASS, ETC.

The design of translucent and decorative glass

David Fulton Co. *Edgar Allen News* 1961 Vol 40 (468) pp 121-124 (June)

The production of translucent and decorative glass is described, a diamond pointed lever being used to cut the pattern on the die. 6 illustr.

B *Ax Bm Ceg Nfz*

Optical systems

M. Laikin (Beckman Instruments Inc). *Instrum & Control Syst* 1961 Vol 34 (3) pp 455-458 (Mar)

In the design of optical systems, important factors include glass type, striae, anneal, stain, and surface quality. Lenses, mirrors, spherical surfaces and flats are discussed. Of particular interest is the section on surface quality, dealing with methods of obtaining required standards for various applications. 3 tables, 1 fig, 3 illustr. *D* *Az Bm Uk*

Power tools for industry

D. P. Cloet. *Elect Manufact* 1961 Vol 6 (2) pp 11-15 (June)

The article is confined to a description of the many roles played by the power saw and the heavy-duty angle grinder. The power saw is described, and also the many different types of blade used, including the diamond-rimmed high-performance blade for cutting stone, granite and concrete. The angle grinder and attachments are discussed, including the depressed centre grinding wheel, the sanding disk and thin abrasive cut off wheels. 5 illustr, 1 table.

B *Bn Ceg Nt/Chc Pr*

Learn from lenses

Anon. *Mod Plast* 1961 Vol 38 (7) pp 99-93, 181-182 (Mar)

It is claimed that lenses can be made more quickly and cheaply from methycrylate, than from glass. Glass lenses have to be shaped and polished with diamond dust tools at very low speeds to prevent cracking, but methacrylate can be worked with less expensive tools, and at a much faster rate. Mathacrylate, however, is limited in application, and has much less resistance to scratching and to heat than glass. Allyl and allyl copolymer spectacle lenses are cast in precision ground and polished glass moulds. 10 illustr.

B *Az Bm Chm Km/Qc Tfb*

Automatic scriber dices wafers with glass cutting action

E. J. Stefanides (Equipment Operations, Lansdale Div, Philco Corp, Lansdale, Pa.) *Design News* 1961 Vol 16 (11) pp 14, 15 (May 22)

The scribing is performed on silicon and germanium semiconductor materials by a diamond scriber mounted on a slide. 1 illustr, 3 figs.

D *Az Bfr Ceg Nfm/Az Bhc Ceg Nfm*

Slate facing a skyscraper

Anon. *Industr Diam Rev* 1961 Vol 21 (243) p 35 (Feb)

A brief description is given of the cutting of slate, using diamond-impregnated saws, to face a 600 ft high building. 1 illustr. *D* *Bnq Ceg Nt*

Dowel holes drilled in 8 seconds

Anon. *Roads & Streets* 1961 Vol 104 (3) p 72 (Mar)

Problem: to drill horizontal holes at close intervals along the inner edge of an existing curb.

Answer: drill holes in about eight seconds each, using a special rig that holds a 1¼ in. carbide insert bit and jackhammer steel against the curb concrete, also rapidly travelling from hole to hole. 3 illustr.

D *Az Cfb Pdcb Pu*

New tungsten carbide bonded diamond saw blades

Diamond Tool Research Co Inc. *Industr Diam Rev* 1961 Vol 21 (243) p 30 (Feb)

A new series of diamond masonry and concrete saw blades is described, featuring both Pressure-Tested diamond grits and a tungsten carbide bond. 1 illustr.

D *Bn Cej Ng Urc/Bny Cej Ng Urc*

Vibro-Tool

Anon. *Elect Manufact* 1961 Vol 5 (9) p 29 (June)

A multi-purpose electrically-operated hand engraver has been announced, capable of engraving ferrous metals of all hardnesses, and of permanently marking all other kinds of hard surfaces such as brass, plastics, ceramics and glass. 1 illustr.

B *Ba Cp Prd*

BP 858,732 **Pittsburgh Plate Glass Co**
(Feb 10, 1958—USA)

Apparatus for glass drilling

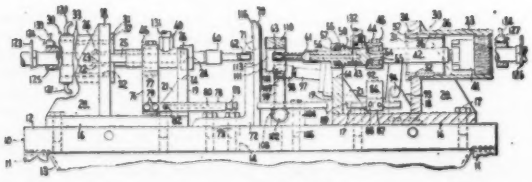


Fig 13. BP 858,732.

Ventilator windows for motor cars are pivotally mounted by clamping a channel member on a pivot around a portion of the patterned window. To eliminate this channel, member holes are provided in the window by the automatic drilling apparatus represented in an elevation, partly in section, in Fig 13. The glass sheet is clamped against backing 70. 62 and 63 are tubular drilling bits with diamond particles embedded in a metal matrix forming the cutting edges. The drills are driven by air turbines and fed by air whereby the hole is drilled from one side by bit 62 with a wall slightly thinner than that of bit 63, which drills from the other side after bit 62 has reached a certain point and this is automatically retracted before the drills would meet. The drills have the same external diameter. Coolant is supplied through fluid swivels connected to the hollow bits. 9 claims, 4 illustr. See also USP 2,674098 (air feed drill units).

J *Az Bm Cfb Pl.545*

USP 2,959,507 **B. Long, Glaces de Bousscis SA**
(Oct 12, 1956—France)

Method for cleaving glass sheets and new articles of manufacture thereby obtained

To cleave a glass sheet generally parallel to its faces 10, 12, Figs 14 and 15, and over its whole extent, a line of weakness 14 is traced in the thickness of its perimeter and a system of internal stresses is then set up in the sheet beginning adjacent one perimetral surface and progressing over the whole sheet. The line may be formed by scoring with a diamond tool or by thermal shock and the cleaving may be effected by directing a line of cooling and the cleaving may be effected by directing a line of cooling air against both faces of the glass as it emerges from a heated chamber or by immersing a heated sheet in a liquid bath.

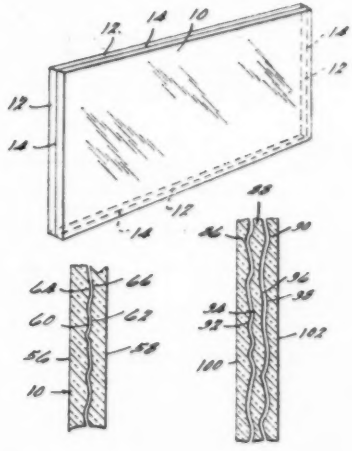


Fig 14 (top) and 15, 16 (bottom). USP 2,959,507.

Alternatively, a double cleavage may be imparted as in Fig 16. The invention is of particular use in the manufacture of vehicle laminated windshields, the space or spaces between the cleft sheets being filled with a plastic or liquid medium having the same refractive index as glass. 11 claims, 9 illustr. Ref cited: 10 USP; 1 BP; 1 FP; 1 DBP.

H *Bmf Cegz.1456.545*

BP 859,650 (Feb 7, 1958—Germany) **H. J. Strunck**

A grinding machine, particularly for grinding the rims of spectacle lenses

Grinding is performed in one continuous operation, the lens being first ground on a diamond wheel and then automatically transferred to a ceramic wheel on which it is ground to completion. The machine may also be adjusted for the lens to be ground exclusively on the ceramic wheel. The machine, Figs 17 and 18, has

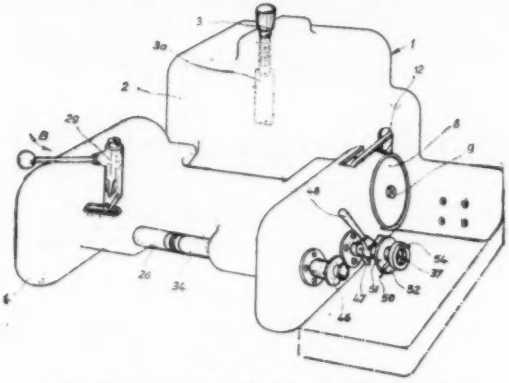
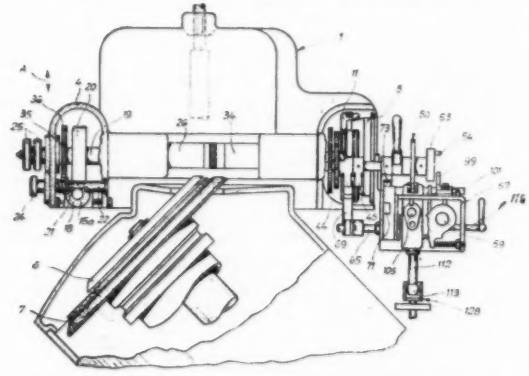


Fig 17 (above) and 18 (below). BP 859,650.



a diamond wheel 6 and a ceramic wheel 7. The lens is gripped between rotatable members 26, 34 mounted in a casing 4 which pivots about a horizontal shaft so as to move the lens towards and away from one of the grinding wheels, the shaft being carried by a part 2 which swivels about a vertical pin 3a so as to transfer the lens from one wheel to the other. 20 claims, 18 illustr. *H* *Bm Chc Nv Tfb.545*

BP 865,132 (Jan 16, 1959) **S. I. Ashworth, Abrasive Developments Ltd**

Grinding lens blanks

A body of water or other liquid carrying abrasive particles, preferably aluminous oxide or silicon carbide of from 60 to 120 mesh, is projected from a gun onto a lens blank at a pressure of from 20 to 60 lbs/sq. in. accelerated by air under pressure of 80 to 100 lbs/sq. in. (40 to 60 cub min). The gun is held at a distance of 2 to 6 in. from the lens blank and traversed across the blank in a path corresponding to the surface shape of the lens. The method is particularly suitable for the preliminary grinding of a lens. 4 claims, 4 illustr.
J *Az Bm Chc Tfb.545*

USP 2,967,381 (Apr 7, 1958) **G. G. Brown, Bendix Corp**

Means for cutting

Frangible bodies *eg* ceramics and crystals for use in transducers, transistors, *etc* have hitherto been sliced by a tool to which ultrasonic vibrations are applied while an abrasive slurry is fed between tool and work-piece. It has been found that a simpler and more effective device can be designed if the ultrasonic vibrations are applied to the work instead of to the

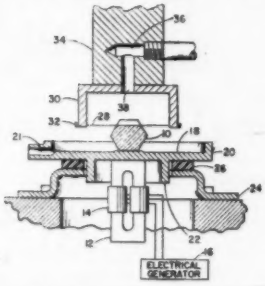


Fig 19. USP 2,967,381.

tool. Fig 19 shows the general arrangement of a ceramic body 10 on table 18 over magnetostrictive core under holder 30 with a number of parallel piano wires 28 on movable arm 34. The abrasive slurry *eg* water and alumina or Norbide particles are fed through passages 36, 38. 1 claim, 2 illustr. Ref cited : 6 USP.
J *Ba Cejz.1456.545*

USP 2,968,866 (May 21, 1958) **R. B. Soper, J. J. Doherty, Sylvania Electric Prod Inc**

Method of producing thin wafers of semi-conductor materials

The production of active semiconductor elements ("dice") from blocks is usually carried out by repeatedly cutting a block parallel to one face into slabs subsequently reduced to the desired thickness. The extreme hardness and brittleness of blocks of germanium or silicon *etc*, make it very difficult to obtain those minute dice by first sawing with a diamond wheel or saw, then grinding or etching to the desired thickness, and the loss of material is substantial. The new method makes use of the effect of a plastic material in form of a coating of the block acting as a support to enable the production of much thinner slices from a block by sawing whereby further burs and chips formerly caused by the saw are eliminated. The plastic material should be curable at low temperatures (20-50° C), because of the sensitivity of germanium and silicon crystals to thermal shock. They should absorb moisture slowly so that the coating forming a thin band around the severed slice can easily be removed simply by immersion of the slice in water. A commercially available diamond wheel of 0.02 in. thickness and 6 in. diamond may be used at 300 rev/min. fed at a rate of ¼ in./min. A suitable plastic for coating is a thixotropic epoxy resin with a moisture absorbing filler. The dice are produced from the slices after reduction by etching by a scribing operation with a diamond tipped tool and breaking at the intersecting scribed grooves. 5 claims, 7 illustr. Ref cited : 4 USP.
J *Az Bde Ceq.545*

USP 2,970,409 (Feb 7, 1958—Germany) **A. K. Seirig and H. J. Strunck, Wernicke & Co KG**

Grinding machine, especially for grinding spectacle glasses

See BP 859,650. H. J. Strunck.

A grinding machine, particularly for grinding the rims of spectacle lenses. 19 claims, 19 illustr.
H *Az Bm Chcz Nv Pr.545*

Swiss P 349,899 (Dec 31, 1956) **H. P. V. Allenbach**
Machine for cutting spectacle glasses. Machine à tailler les verres de lunettes

Refers to a compact portable machine for cutting and bevelling the edges of lenses before they are mounted in frames. Fig 20 is a partial sectional elevation of the machine and Fig 21 is a perspective view of a hand rest shown separated from the machine. A motor driven

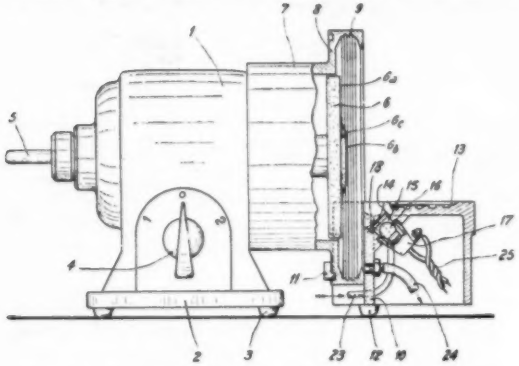
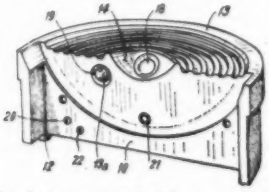


Fig 20 (above) and 21 (below). Swiss P 349,899.



grinding wheel 6 surrounded by a protective sleeve 7 secured to the motor housing which has a vertical and working face in front of which is provided a hand rest secured to the sleeve 7 with a semi-circular grooved upper surface 13 midway between the bottom and the centre of the wheel. The wheel comprises a radial ring 6a of coarse abrasive for bevelling and a central truncated land of fine abrasive for grinding the concave edges end for polishing the lenses. A projector lamp is provided at 16, 18, and cooling fluid is fed tangentially to the working face of the wheel through a conduit 23 which terminates in an adjustable nozzle 19a mounted in an orifice 19 in the hand rest. 7 claims, 3 illustr.
H *Bm Ceg Pr Tfbz.545*

Swiss P 351,210 (Feb 10, 1958) **J. V. S. Festus, Pittsburgh Plate Glass Co, Pittsburgh, Pa**
Apparatus for drilling a hole in a sheet of glass. Appareil pour le perçage d'un trou dans une feuille de verre

A glass sheet is clamped between a rubber-backed jig plate 70 and an air-operated pad 110 and is drilled by hollow diamond-impregnated cutting bits 62, 63 of a pair of opposed identical drill units 30. The drill units comprise air-operated vane type motors with combined piston and cylinder-feed mounted in stationary holders 33 to which control valves 124, 127 are secured. Adjustable collars 123, 126 on the moving parts of the drills contact the valves 124, 127 to stop rotation and reverse the feed. Coolant is supplied to the bits through pipes 131, 132 and the bored forward parts of the drill spindles. The pad 110 is pivoted through an arm 109 to the base 12 of the machine. A linkage 98-102 connects the pad to the piston 97 of a pivoted air-cylinder device 92 for clamping the sheet. During

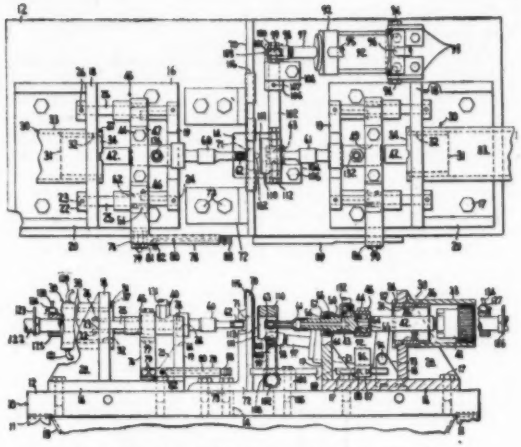


Fig 22 (top) and 23 (bottom). Swiss P 351,210.

operation, which is fully automatic, the feed of the drill bit 62 which has a smaller wall thickness than the bit 63 is reversed before the bits meet, drilling of the hole being completed by the bit 63. A safety valve 83 is adapted to contact a stop rod 89 if the left-hand drill unit fails to stop. 8 claims, 4 illustr.
H *Bm Cfb Pl.545*

FP 1,240,167 (Sep 30, 1959) **Textron Inc**
Machine for preparing by abrasion the rims of opthalmic lenses. Machine à usiner par abrasion des bords de verres ophtalmiques

The machine is used for grinding bevelled or flat edges on opthalmic lenses. It consists of a cup-shaped grinding wheel W, Fig 28, secured to a spindle 22 driven by a motor 50. The lens L is clamped between clamping heads 125, 126, Figs 25 and 26, secured to shafts 127, 128 rotatable through gearing by a motor 150 and

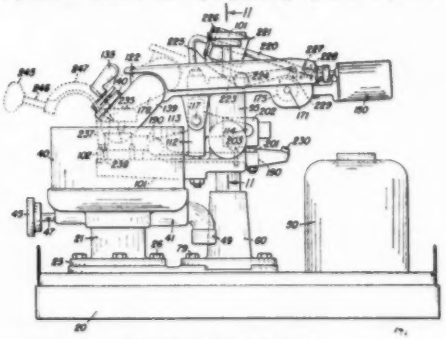


Fig 24. FP 1,240,167.

mounted in a work support 120 adapted to swing about a horizontal axis on a bracket 112 journaled on a bracket 95, Fig 24, vertically adjustable on a column 90. The shaft 127 carries a template 182 which controls the shape of the lens and is adapted to engage a shoe 187 adjustably mounted on the end of an arm 190, Fig 27, pivotably mounted on an arm 114 of bracket 112. The shoe 187 is held in contact with the template 182 by a spring-pressed plunger 201 housed in the arm 190 and engaging a block 202 on the arm 114. As the lens is ground in one position, the template 182, shoe 187 and

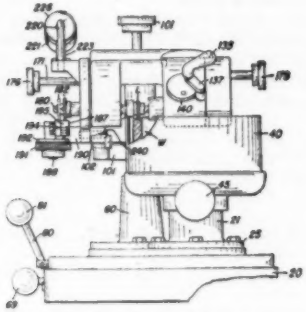


Fig 25. FP 1,240,167.

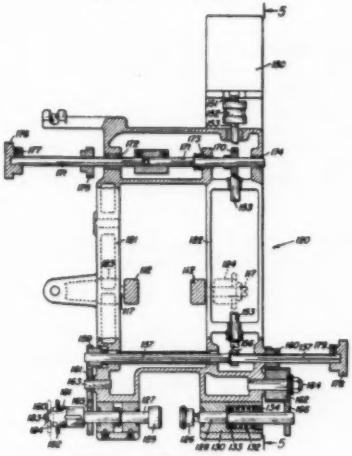


Fig 26. FP 1,240,167.

arm 190 move downwardly together. When grinding in this position has proceeded to a point where the template has rocked the arm 190, through the shoe 187, far enough for the plunger 201 to be fully compressed, an adjustable screw 203 trips a limit switch on the block 202 to start the motor 150. The lens is thereby rotated through a sufficient angle so that by engagement with the grinding wheel it lifts the template upwardly again, thus permitting the plunger 201 to rock the trip screw 203 away from the limit switch to stop the motor 150. The wheel thereupon grinds the lens in its new position. For dressing the wheel, a diamond 235 is mounted on an arm 247 removably secured to the support 120 and to which is secured an arm 237 carrying a follower 238 adapted to engage a template

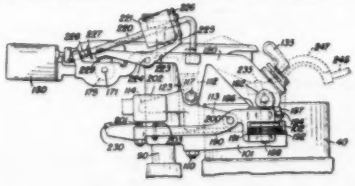


Fig 27. FP 1,240,167.

102 on an arm 101 of bracket 95 for controlling the dressing. A modified construction is illustrated. 14 claims, 20 illustr. *H* *Cfb Pr Tfbz.545*

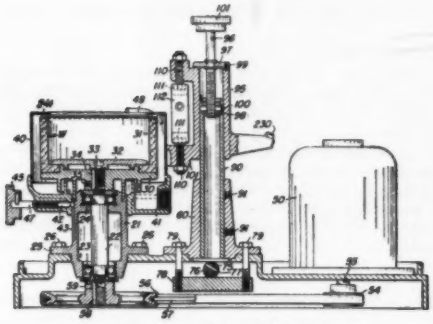


Fig 28. FP 1,240,167.

FP 1,239,002 **Eisenwerk Hensel, Bayreuth**
(Oct 4, 1958—Germany)

Stone saw. Scie à pierres

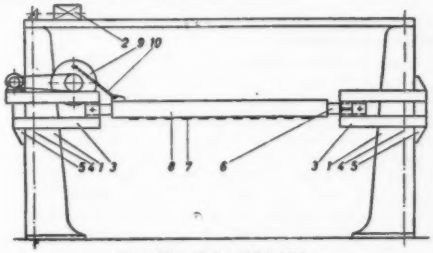


Fig 29. FP 1,239,002.

Fig 29 is an elevation of a single blade cross-cut saw and Fig 30 is a plan view of a multiple blade saw. In Fig 29 the saw blade 8 having diamond cutting tools 7 is reciprocated by a crank and connecting rod 9, 10 to guides 6 constituted by steel bands mounted between brackets 3 which are displaced vertically on spindles 4 along columns 1 by a variable transmission 2. In Fig 30 the guides 6 are mounted between cross-members 11 joining the brackets 3. The blades 6 are provided

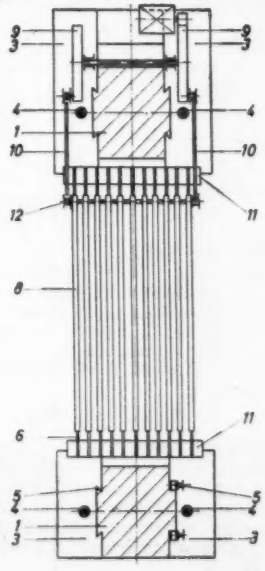


Fig 30. FP 1,239,002.

with perforated flanges through which is fitted a rod 12 connected at each end to a crank and connecting rod. 8 claims, 3 illustr.

H *Bn Cej Pc.545*

GEM POLISHING

Texas gemstones

E. A. King jun. *Report of Investigations 42*, Bureau of Economic Geology, University of Texas, Austin, Texas, USA, 1961. *Econ Geol* 1961 Vol 56 (4) p 810 (June-July) (June-July)

Book, 42 pp, 6 plates, 20 figs, 1 table. Price 40 Cents. Twenty-three Texas gemstones are described. Detailed procedures, including illustrations, are given for cutting and polishing gemstones, it is stated.

[Not in library of Industrial Diamond Information Bureau]. *D* *Bb.342.52*

Russians use ultrasonics for diamond cutting

A. J. Steiger. *Industr Diam Rev* 1961 Vol 21 (243) pp 36-37 (Feb)

An ultrasonic method of diamond cutting developed in the USSR is claimed to have speeded up the process by four to five times.

D *F Hl.1331.1456.33*

Rubber-bonded wheels

Anon. *Industr Diam Rev* 1961 Vol 21 (245) pp 75-76 (Apr)

The article is principally concerned with the needs of the amateur gem cutter, but the techniques and equipment described can be adapted to wider uses. The disadvantages of earlier methods of producing a reasonably smooth surface before final polishing are summarized, and the improvement resulting from the development of rubber sanding wheels for this purpose outlined. Versatility, long life and economy in use are among the main advantages. The final polishing may be done with diamond powder when hard gemstones are being worked. 2 illustr.

G *Bb Chf Ph Urg*

X-ray diffraction camera for the alignment of large single crystals

R. W. Meyerhoff, D. M. Bailey, J. F. Smith (Institute for Atomic Research and Depts of Chemistry and Metallurgy, Iowa State University). *Rev Sci Instrum* 1961 Vol 32 (6) pp 715-717 (June)

A simple scribing device is included in the apparatus. 3 figs, 2 ref. *D* *Bd Cz Uklb Wcf*

ROCK DRILLING

News and views

Anon. *Min Congr J, Wash* 1961 Vol 47 (5) p 88 (May)

A diamond drill, said to be the world's largest, has been installed at Kalgoorie Southern Gold Mines, in Australia. The drill is designed for drilling either vertical or angle holes to depths in excess of 10,000 feet. The rig, it is claimed, can be operated by two men. *D* *Cfb Nh Pr.38*

News and views

Anon. *Min Congr J, Wash* 1961 Vol 47 (4) p 112 (Apr)

A 1200 ft diamond drill hole being put down by the Sunshine Mining Co is now said to be past the 500 ft point. The hole will test ore-bearing formations at depths which have not previously been explored.

D *Be Cfb Nh.342*

Diamond bits in deep wells

M. T. Gusman, A. M. Zarkhin. *Neft Khoz* 1960 (12) p 11; *Petroleum* 1961 Vol 24 (3) p 113 (Mar) (Abstr; original in Russian)

Results of diamond drilling tests in deep rock formations are described. It is stated that it is expedient to use diamond bits with diameter of not more than 189 and 212 mm (approx 48 and 54 in.), bearing in mind the subsequent widening in the case of working large dimension wells.

D *Az Cfb Nhb*

The geology of the Flat River tungsten deposits : Canada Tungsten Mining Corp Ltd

C. J. Brown. *Canad Min metal Bull* 1961 Vol 54 (591) pp 510-513 (July)

In 1960 some 11,000 ft of diamond drilling was completed on the main deposit. 2 illustr, 5 ref.

B *Bfp Cb Nh.12.343*

A large pillar blast at the Sullivan Mine

R. M. Porter. *Canad Min metall Bull* 1961 Vol 54 (587) pp 252-257 (Mar)

TNT diamond drills and Boyles BBU-2 diamond drills were used to drill 1 5/16 in. and 4¾ in. holes respectively in preparation for this blasting operation. Both drills and the bit and reaming shell for drilling the 4¾ inch holes are illustrated. 11 illustr, 3 ref.

B *Cb Nh.343*

The Murray Deposit, Restigouche County, N.B. : A geochemical-geophysical discovery

H. W. Fleming. *Canad Min metall Bull* 1961 Vol 54 (587) pp 230-235 (Mar)

The Murray massive-sulphide deposit was first intersected by a diamond-drill hole in November 1956, the culmination of an integrated exploration plan over the area, involving elements of all accepted exploration techniques. 9 illustr, 7 ref.

B *Nh.12.343*

Air transport in the diamond drilling industry

C. V. Godwin. *Canad Min J* 1961 Vol 82 (3) pp 57-60 (Mar)

Paper presented at the 1960 Annual Meeting, Canadian Diamond Drillers Association.

B *Bn Cfb Nh.25:Cb.137*

Mining technique and its development in Swedish mining. Brytningstekniken och dess utveckling inom svensk gruvhantering

I. Janelid. *Jernkontorets Annaler* 1961 Vol 145 (6) pp 295-403 (In Swedish)

Amongst other aspects of mining technique, the article deals with boring and diamond drilling. The Craelius Prosper light diamond-boring machine is discussed and illustrated. Diamond drill crowns and diamond drilling of blasting holes are also mentioned. 75 illustr, 24 tables, 27 refs.

B *Cb Nh.132.329*

Physical mechanics

R. Courtel, E. Mencarelli. *Industr Diam Rev* 1961 Vol 21 (248) pp 133-135 (July)

Describes the study of small surfaces of friction and wear by the replica method. The different characteristic types of damage to the surfaces of drilling diamonds caused by working in the rock are briefly analysed. An important feature of the method is said to be its great sensitivity to every alteration on the tool surface due to friction and shocks during working. 4 illustr. *G* *Nhb Unr.21*

News and views

Silver Star Queens Mines, Inc, Bellevue, Idaho, USA. *Min Congr J, Wash* 1961 Vol 47 (4) p 112 (Apr)

Diamond drilling below the 450 ft level of the Rockwell shaft is said to have led to the discovery of the Minnie Moore vein, which had a production record, it is stated, of about $9,000,000.

D *Cfb Nh.12.342*

Mine exploration

Anon. *Canad Min J* 1961 Vol 82 (2) pp 171-172 (Feb)

Exploration procedures by a number of individual Canadian companies are given, a large number of which are employing diamond drilling.

B *Cb Nh.12.343*

Current topics : Progress in project Mohole

Anon. *J Franklin Inst* 1961 Vol 272 Pt (1) (1627) pp 82, 83 (July)

A turbodrill—a drilling and coring device, manufactured by Neyrtic of Grenoble, France, was successfully tested in the final operations of the first part of Project Mohole. The turbodrill rotated a diamond-studded bit at 750 rev/min for 2 hours through dense basaltic rock more than 500 ft below the ocean floor. The turbodrill was rotated by sea water pumped down the stationary drill pipe at 1750 pounds per square inch. The preliminary geological findings are outlined.

D *Bnt Cfbd Nhb*

Most recent information on the boring of large holes with roller bits in underground mining in the Ruhr. Neueste Erkenntnisse im Grosslochbohren mit Rollenmeisseln im Ruhrbergbau unter Tage

K. Trösken. *Glückauf* 1961 Vol 97 (14) pp 827-836 (July 5) (In German)

The development of roller drill heads is described and discussed. Sintered carbide drills are mentioned and compared to roller drills. 20 illustr, 3 tables, 11 ref.

B *Cb Pl Rh.322*

Wireline drilling in Australia

E. J. Longyear Co Inc. *Min & Chem Engng Rev* 1961 Vol 53 (10) pp 46-48 (July)

The techniques and equipment for wireline diamond drilling, developed by E. J. Longyear Co, USA, have been used successfully at Mount Isa and Newcastle. 5 illustr, 1 table. *B* *Cfbz Nh.342*

Austrian mining in 1960 : Oil and gas. Der österreichische Bergbau im Jahr 1960 : Erdöl und Erdgas

H. Kern. *Berg- u hüttenm Mh* 1961 Vol 106 (7) pp 236-237 (July) (In German)

Amongst other innovations in equipment, diamond drill bits have been introduced recently into Austrian boring operations with great success.

B *Cfb Nhb.3255*

The basic variables in rotary drilling, Pt II

B. G. Fish. *Mine & Quarry Engng* 1961 Vol 27 (2) pp 74-81 (Feb)

• In this section, the drilling mechanism is considered and particular reference made to rotation speed, the effect of rock type on drill bit wear, and drillability. One figure compares variation of bit life with hardness of carbide. 19 ref, 11 figs. *D* *Cfbr.21*

LITERATURE REQUESTS

Please quote the page number of the journal which contains the original reference, and the author and title of the article, in all cases.

Laboratory drilling performance of the full-scale rock bit

D. S. Rowley, R. J. Howe, F. H. Deily (Jersey Prod Res Co, Tulsa, Okla). *J Petrol Tech* 1961 Vol 13 (1) pp 71-79 (Jan)

During the past three years an extensive series of tests using roller cone, drag and diamond bits varying in size from 3¼ to 9⅞ in. have been made in a wide range of drilling conditions in several types of rocks. This paper reports the effects of bit weight and rotary speed on the penetration rate and power consumption of a 4¼ in. hard-formation rock bit drilling in impermeable dolomite. 24 refs, 12 figs, 6 tables.

D *Bn Cfb Nhb.1312*

Combined bit and reamer

L. M. Bailey. *Sydney Water Board J* Vol 8 (3); *Chem Engng & Min Rev* Vol 51 (5); *Mine & Quarry Engng* 1961 Vol 27 (1) p 48 (Jan)

At the Warragamba dam, near Sydney, excavation has been advanced by boring with XR 350 Mindrils, which give fast penetration rates. The standard XRN blasthole bit and reamer operated in sandstone and shale was unsatisfactory, and the reamers also gave trouble. As a remedy the bit and reamers were made as a single unit. Many such bits have given over 1,000 ft, and some over 2,000 ft. This combined bit and reamer is said to be unique in diamond drilling practice. *B* *Nhb.38*

FP 1,241,165 (July 28, 1959) **W. Tiraspolsky**

Roller drill bit. Trépan à molettes

A roller bit has each of its rollers consisting of a body 10, Fig 31, surrounding its pivot 9, and a cap 14 covering the end of the pivot. The body has teeth 11, 13 and the cap has radial lands, the face of the lands and the surface 12 of the teeth 11 being provided with an abrasive diamond coating. The roller is mounted on its

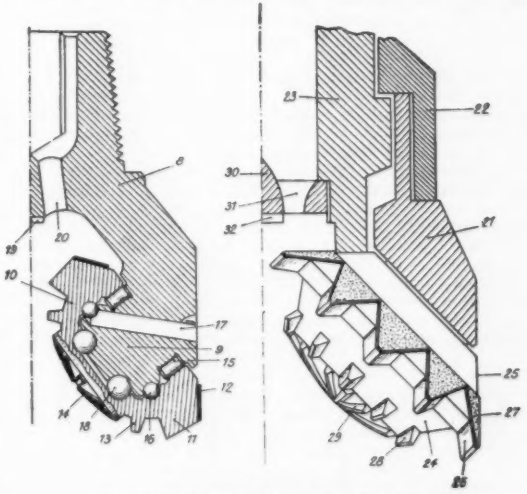


Fig 31 (left) and 32 (right). FP 1,241,165.

pivot by means of bearings 15, 16, 18, the balls 16 serving to lock the roller on the pivot and the balls 18 acting as thrust bearings. The bit has a core cutter 19 and apertures 20 for drilling fluid. In Fig 32 the rollers are driven by a shaft 23 which engages surfaces 25 on the rollers. The bit may be modified for coring work. 7 claims, 4 illustr. *H* *Plb.545*

BP 860,555 **E. J. Longyear Company**
(Sep 18, 1958—USA)

Improvements in apparatus for core drilling earth formations

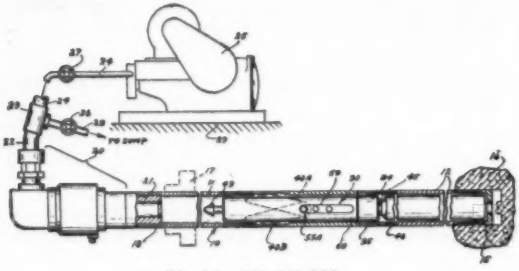


Fig 33. BP 860,555.

Known wire line core drilling equipment is designed to operate vertically, the core barrel inner tube assembly being lowered through the drill stem and recovered by a wire line overshot assembly similarly lowered. The present apparatus operates in any direction, the inner tube and overshot assemblies being

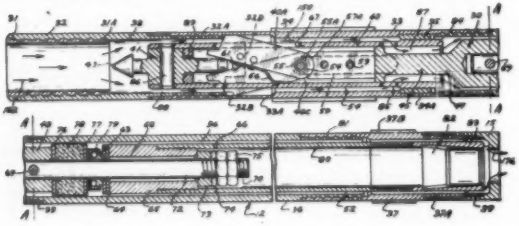


Fig 34 (top) and 35 (bottom). BP 860,555.

propelled by fluid through a drill stem and retracted, by a wire line attached to the overshot assembly, without reversal of fluid flow in the drill stem. The apparatus Figs 33, 34 and 35, comprises a rotatable drill stem 10 having a diamond reaming surface 37B and an annular core bit 15. The stem is shown connected to a hydraulic pump 25 through a swivel 20. The inner tube assembly consists of a core receiving tube 80 non-rotatably connected through a cap 65 a bearing 79 and a spindle 72 to a latch body 45 carrying latch dogs 40A, 40B which engage in openings in a tube 60 slideable relative to the body 45. The tube 60 carries a plug 41 provided with a spear point 43 and with an opposite extension which engages the latch dogs to maintain the latter in a latched position when the inner

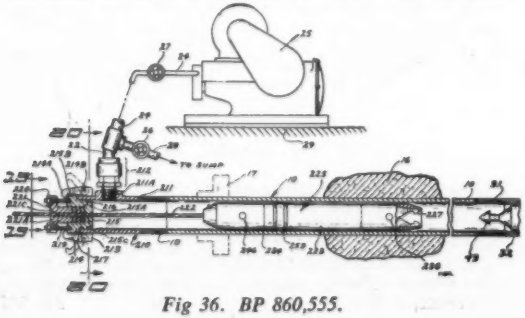


Fig 36. BP 860,555.

tube assembly is propelled towards the bit 15. The overshot assembly 225, Fig 36, is provided with spring-biased jaws 227 for engagement with the spear point 43 for retracting the inner tube assembly on pulling a wire line 222. 22 claims, 28 illustr.

H *Bnt Cfb.1456.545*

BP 866,862 **Bolidens Gruvactiebolag**
(Dec 9, 1958—Sweden)

Apparatus for diamond drilling bore holes

The electric motor driving the drill is reciprocably mounted on a pair of guides. The ends of the guides are pivotally mounted on a plate anchored to the rock and a guiding member on the plate serves for correct alignment in the initial stages of drilling. Figs 37 and

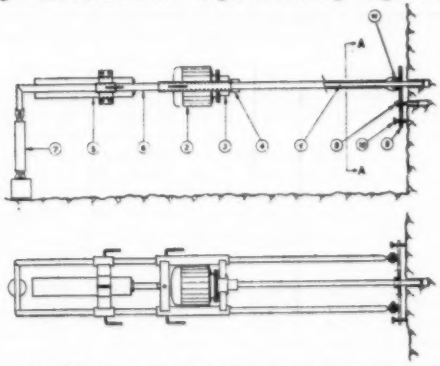


Fig 37 (top) and 38 (bottom). BP 866,862.

38 show the drill shaft 1 driven by motor 2. 5 is a hydraulic mechanism to feed the motor between guides 6 towards the rock face where the drill shaft passes through anchoring plate 8. Hydraulic device 7 enables movement of the assembly for exchange or withdrawal of the hollow drill shaft after disconnection from the motor. 4 claims, 3 illustr.

J *Bn Cfb Nh.545*

BP 867,072 **Jersey Production Research Co**
(Mar 2, 1959—USA)

Drill bits

The necessity of frequent replacement of drill bits when boring deep holes (10,000 ft and more) adds greatly to the total costs, while the cost of the drill bit itself becomes a progressively smaller part of the total cost the deeper the drilling becomes. It is therefore of great importance to design drill bits which require less frequent replacement. The drill bit represented in Fig 39, 40 and 41 is characterized by an automatic renewal of the cutter elements as they become worn. The elements 37 are blade-like cutters in a housing member 31 adapted to expose and support the cutting edge. Cutting fluid is discharged adjacent to the cutting edge. The cutters are connected to the central rod 35. Shoe 32, with upper extension 33, surrounds rod 35 which can slide within this shoe. The shoe is built up of two halves with their lower ends surfaced with diamond or tungsten carbide, *etc*, particles. The cutters project beyond the radius of those halves as seen in the section Fig 40. The leading faces of cutter 37 may be coated with tungsten carbide (" Tube Borium ") cast inserts of diamond and tungsten carbide particles, being soldered along the longitudinal edges of the cutters. When drilling, shoe 32 in housing 31 is only loaded so as to

(continued on next page).

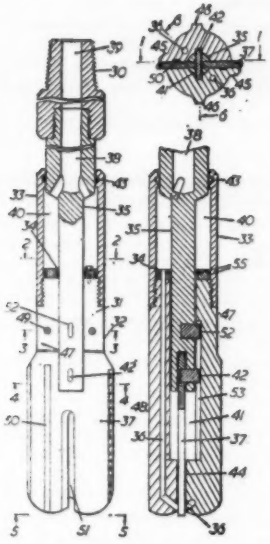


Fig 39 (left), 40 (top), and 41 (right). BP 867,072.

ride along the bottom of the borehole. The load on cutters 37, on the other hand, is so regulated that it penetrates a fraction of an inch within the rock. As cutters 37 become worm they merely move downward within housing 31, automatically presenting fresh cutting edges. The cutters in effect perform a gauge-reaming action and it has been found that diamond particles in these edges should be fine rather than large. About 20 to 42 mesh particles have been successfully employed. 7 claims, 12 illustr.

H *Bnt Cfb Plb.545*

WIRE DRAWING

Appliances for grinding and polishing dies

A. A. Ivanov. *Machines & Tooling* 1961 Vol 32 (3) pp 43-44 (Original in Russian)

This appliance, which is mounted directly on the fitter's bench on a special light stand with rotating equipment, is claimed to simplify the work of the tool setter and to increase production. 2 illustr.

K *Ax Chc Psc/Ax Chm Psc*

Dies of carbide materials

B. R. Lazarenko. *Vest AN SSSR* 1961 Vol 31 (4) pp 83-87 (Apr); *Library of Congress Mthly Index Russ Access* 1961 Vol 14 (4) p 919 (July) (In Russian)

D *Px*

DIAMOND TECHNOLOGY

First published 1942 as "Production Methods for Diamond and Gemstone." The second edition of this book by P. Grodzinski has been revised throughout and considerably enlarged. 840 pages, 486 illustrations, 94 tables, and indexes. From NAG Press Ltd., 226 Latymer Court, London W 6. 55s 0d, post free.

GRINDING AND POLISHING OF CARBIDES AND METALS

Precision grinding research

H. Grisbrook. *J Inst Prod Engrs* 1960 Vol 39 pp 341-346 (June); *J iron st Inst* 1961 Vol 197 Pt 3 p 265 (Mar) (Abstr)

This is the second part of a paper on research into precision grinding carried out by the Univ of Birmingham, Dept of Engng Prodn, on a Churchill 8 × 16 in. plain surface grinder.

D *Chcn.131*

Diamonds are this job's best friend

Anon. *Industr Diam Rev* 1961 Vol 21 (243) pp 17-19 (Jan)

The precision grinding of hard ceramic parts was found to be most economical when using diamond abrasive wheels. At the Raytheon Mfg Co's Waltham plant tolerances of 0.00025 in. must be maintained on some jobs. Size of parts ranged from 4¼ in. diameter cylinders to 0.008 in. thick disks.

D *Az Bl Chcw Nv*

Surface grinding—a new approach

B. McDivitt. *Austral Mach Prodn Engr* 1960 Vol 13 pp 51, 53 (June); *J iron st Inst* 1961 Vol 197 Pt 2 p 171 (Feb) (Abstr)

Abrasive belt platen grinders are described.

D *Agc Chcm Pee Pr*

Application of industrial diamonds III

H. J. Otterloo. *Industr Diam Rev* 1961 Vol 21 (245) pp 66-72, 79 (Apr)

It is stressed that it is now more difficult to select an appropriate grinding wheel since a choice must be made between natural and synthetic diamond as abrasive. In order to clarify the position, the author compares his own experience in this field with other observations, first reviewing briefly the properties of both types of diamond. Prof. Pahlitzsch's tests of grinding wheel performance made earlier in the development of synthetic diamonds are considered and related to the author's methods of checking results in practice at low cost. Graphs and tables help in the interpretation of his observations. The article ends with practical hints for grinding with diamond wheels and with a discussion of special diamond wheels type 'S' and grinding points. 16 illustr.

G *Nv*Nvh/Nv Uqe*

Application of industrial diamonds VI

H. J. Otterloo. *Industr Diam Rev* 1961 Vol 21 (248) pp 126-132 (July)

An economical method of preparing the hard metal work supports often necessary in centreless grinding is explained. It is stressed that only by using diamond grinding wheels can preparation time be kept down and the risk of making hair cracks in the tools be reduced to a minimum. A certain procedure must be followed if the method is to succeed and this is described before the actual grinding operation. 18 illustr.

G *Chcc Nv Pr.21*

Grinding of ball ends. Schleifen von Kugelköpfen

Markmann Biørn. *Maskin Industrien* (Denmark) 1961 Vol 12 (6) p 223; *Industrieblatt* 1961 Vol 61 (9) p 599 (Sep) (In German, original in Danish)

An electronically controlled grinder for grinding ball ends is described. 1 illustr.

B *Agz Chc Pr Wpz*

Swiss machine tools at the 7th EWA. Grinding machine for sintered carbide tools. Schweizer Werkzeugmaschinen an der 7. EWA : Schleifmaschinen für Hartmetallwerkzeuge

Ewag AG, Solothurn. *Technica* 1961 Vol 10 (19) p 1249 (Sep 8) (In German)

The Ewag WS 11 tool grinding machine is claimed to be able to finish grind a cutting tool from a sintered carbide rod. 1 illustr.

B *Al Chc Pr.323:.27.3235*

Sharpening knives that can split a human hair into eight slices

Eastman Kodak Co, Rochester, NY. *Mach Tool Blue Bk* 1961 Vol 56 (9) p 20 (Sep)

Microtome knives are ground on a rotating plate with special abrasive compounds. The plate material has a hardness of sapphire, and is polished optically flat. It is claimed that about 140 knives can be sharpened before the plates have to be repolished.

B *Az Ceg Pdm*

Shining dies

Parker-Hartford Corp, Hartford, Conn. *Tooling & Prod* 1961 Vol 27 (6) p 123 (Sep)

A new die polishing machine, claimed to polish nearly all styles of dies, features an endless abrasive belt driven at 5000 rev/min to polish the die parallel to the line of draw. An angle polishing fixture accurately maintains die manufacturer's specifications on approach, back relief angles and bearing sizes. The unit is said to be suitable for polishing new dies or for reworking worn ones. 1 illustr.

D *Az Chm Pee Pr*

Dormer profile tool and cutter grinder

Sheffield Twist Drill & Steel Co Ltd, Summerfield Street, Sheffield 11. *Metalworking Prod* 1961 Vol 105 (37) pp 80-81 (Sep 13)

Besides fulfilling the functions of a conventional tool and cutter grinder, it is claimed that this machine also allows form grinding to be carried out by simple radial movement of one hand lever. 1 illustr.

B *Al Chch Pr*

Powerful hydraulic press built for production of grinding wheels

Birdsboro' Corp, Birdsboro', Pa. *Machinery, NY* 1961 Vol 68 (1) p 162 (Sep)

This two-station hydraulic grinding wheel press may, it is stated, be operated at different pressing strokes, tonnages and daylight openings at each station. The 1600 ton press is a single action, down-movement, four column machine equipped with interlocking controls. It is being set up for production by a leading grinding wheel manufacturer. *D* *Pe Qc:Prx*

Electroplate-bonded diamond wheels

Diagrit Diamond Tools Ltd. *Metalworking Prod* 1961 Vol 105 (38) pp 57-59 (Sep 20)

Diamond wheels that will grind carbide, ceramic, ferrite, and hardened steel, and will run dry, keep their form, have free cutting characteristics and can be made as small 0.02 in. diameter have resulted from an electrometallic bonding process, it is claimed. 5 illustr.

B *Nv Urd*

LITERATURE REQUESTS

Please quote the page number of the journal which contains the original reference, and the author and title of the article, in all cases.

Flat surface grinding

G. F. Kudasov. *Mthly Index Russ Access* 1961 Vol 13 (11) p 3363 (Feb) (In Russian)

Book, Gos nauchno-tekhn izd-vo mashinostroit. lit-ry, Moscow, 1960, (Bibliote Kha shlifovshchikha No 5), 77 pp.

[Not in library of Industrial Diamond Information Bureau]. *D* *Chcm.1456.33.52*

The grinding and setting of tangential roller box tools

G. B. Booth. *Prod Engr* 1961 Vol 40 (9) pp 617-620 (Sep)

B *Alz Chc*

Centreless grinding

V. I. Mutsianko. *Library of Congress Mthly Index Russ Access* 1961 Vol 13 (11) p 3364 (Feb) (In Russian)

Book, Gos nauchno-tekhn izd-vo mashinostroit lit-ry, Moscow, 1960, 78 pp.

[Not in library of Industrial Diamond Information Bureau]. *D* *Chcc.1456.33.52*

Metallographic method for producing a smooth ground surface on non-ferrous metals. Metallographische Schliffherstellungsverfahren von Nichteisenmetallen

W. Strohfeld. *Industrieblatt* 1961 Vol 61 (9) pp 566-570 (Sep) (In German)

The metallographic method of processing non-ferrous metals, with reference to practical examples. The grinding and polishing processes are described in detail. 12 illustr, 15 ref. *B* *Bfc Chc.1456*

Blade-polishing : Reciprocating tape polishing machine for angled-platform shrouded turbine blades

Anon. *Airc Prod, Lond* 1961 Vol 23 (3) pp 109-114 (Mar)

Describes the process and equipment used by Rolls-Royce Ltd at their Derby Works. 9 illustr.

B *Aq Chm*

Grinding and polishing

Geoscience Instruments Corp, 142 Maiden Lane, New York 38, NY. *Rev sci Instrum* 1961 Vol 32 (7) p 883 (July)

Uni-Pol is a laboratory tool for fine lapping and polishing. A ¼ hp d.c. motor, operated from 110 volts a.c. through silicon powder rectifiers, provides, it is claimed, a constant torque at all loads and continuously variable speed control from 80 to 1200 rev/minute.

D *Chd Pr.264/Chm Pr.264*

Technical developments of 1960

N. Hall. *Metal Finish* 1961 Vol 59 (1) pp 36B-36K, 93 (Jan)

The section on polishing contains sub-sections on mechanical, chemical and electrolytic barrel finishing. 386 ref. *D* *Chm/Chmkz/Chmz*

Lapping automobile components

Anon. *Auto Engr* 1961 Vol 51 (6) pp 236-240 (June)

Examples of the use of Lapmaster machines in large scale production are given, in particular at the Vauxhall Motors Ltd plants. Also included is a description of current US practice on light alloy cylinder blocks and heads. 8 illustr.

[See also : *Industr Diam Abstr* 1961 Vol 18 p A210 (Aug)].

D *Aqz Bfxz Chd Pr/Az Bfxz Chd Pr*

A new dispenser for Hyprez diamond compound

Engis Ltd, Maidstone. *Industr Diam Rev* 1961 Vol 21 (243) p 32 (Feb)

See also : *Industr Abstr* 1961 Vol 18 p A210 (Aug).

D *Kmj Mz*

Grinding the spiral of chuck disks

K. G. Savateev. *Machines & Tooling* 1961 Vol 32 (3) pp 42-43 (Original in Russian)

Describes a set-up for grinding chuck spirals on a re-equipped MK 51 spiral cutting machine (made by the Moscow Krasnyi Proletarii factory) in the Pskov machine building factory. 4 illustr.

K *Az Chc Pr*

Deburring gears : simultaneous rotation of work and removal of burr by formed grinding wheel

Anon. *Aircr Prod Lond* 1961 Vol 23 (2) pp 76-77 (Feb)

The working of the Burrows and Smith deburring machine, equipped with a Norton grinding wheel, is described. 3 illustr. *B* *Ad Cht Pr:Pe*

Grinding wheel, small and compact

Anon. *Canad Min J* 1961 Vol 82 (7) p 77 (July)

This grinder, for the field sharpening of tungsten carbide drills is powered by the 'Pionjar' rock drill, via a flexible shaft attachment and is set to give automatically the correct edge angle and radius when grinding. 1 illustr.

B *Alb Bkcb Chc Pr*

How to finish flame-plated coatings

M. A. Teter. *Industr Diam Rev* 1961 Vol 21 (248) pp 136-139 (July)

Conventional equipment and abrasives can be used for finishing flame-plated coatings of hard materials if techniques developed by the Linde Co are followed, it is claimed. There are two main methods, one involving precision diamond grinding or diamond grinding plus lapping, and the other using off-hand polishing with either silicon carbide or diamond abrasives. Choice of diamond wheel and technique of finishing are described. 5 illustr.

G *Ba Chr:Chm Nv Pr*

Bit grinder

AB Kristenson & Grähs, Handen, Sweden ; Brit rep : Holman Group. *Mine & Quarry Engng* 1961 Vol 27 (6) p 288 (June)

Known as the Grindex Rockmaster, this machine is for grinding carbide tipped drill steels. Provision is made, it is claimed, for compensating grinding wheel wear. Standard 8 × 4 × 1¼ in. silicon carbide grinding wheels can be fitted to this machine. A portable version, the Junior, is also available.

D *Alb Bk Chc Pe Rgc Unr*

Application of industrial diamonds I

H. J. Otterloo. *Industr Diam Rev* 1961 Vol 21 (243) pp 26-29 (Feb)

Part 1 deals with an outline of general applications and the form, construction and use of diamond grinding wheels. *D* *Nv.21*

Rubberised abrasives

Pollett Bros Ltd, Waterloo Works, Burton-on-Trent. *Mass Prod* 1961 Vol 37 (5) p 102 (May)

These abrasive wheels, points, blocks, sticks and cones for deburring, smoothing, cleaning and polishing are made from chemical rubber blended with electrically fused silicon carbide abrasive and other selected ingredients. 1 illustr. *B* *Pe Urg*

Sanding equipment : Les matériels de sablage

A. Ogus. *Metallurg constr mecan* 1961 Vol 93 (7) pp 613-621 (July) (In French)

General. Free jet sanding machines and suction sanding machines. Sanding tents, rooms, cabins, guns and nozzles. 14 illustr. *B* *Chf Pr*

Controlled belt grinding Part I—Developments in coated abrasives : producing aerofoil forms

H. J. Pearson. *Aircr Prod Lond* 1961 Vol 23 (1) pp 24-33 (Jan)

Although originally regarded purely as a polishing medium, abrasive coated belts have undergone considerable development, and the free-cutting properties now obtainable make them suitable for grinding purposes. Here the types of belt available for precision operations are discussed with the initial difficulties encountered when machining aerofoil sections by this medium. 19 illustr, 3 tables, 4 ref.

B *Chm Pee/Rdg.132*

Controlled belt grinding : Part II—Production of turbine blades : Developments in operational practice

H. J. Pearson. *Aircr Prod, Lond* 1961 Vol 23 (2) pp 42-46 (Feb)

Deals with belt-grinding practice at Rolls-Royce Ltd, Derby, and Bristol Siddeley Engines Ltd, Filton.

B *Aq Chc Pee*

Abrasive belts speed finishing

J. H. Miller. *Industr Finish, Lond* 1961 Vol 13 p 27 (June) ; *Battelle Techn Rev—Abstr* 1961 Vol 10 (9) col 871 (Sep)

Structure and composition of the belts are discussed in relation to various finishing processes. Some useful advice on how to obtain the best results with abrasive belt grinding and polishing, and how to obtain optimum results with the equipment selected.

B *Chc Pee/Chm Pee*

Behr-Manning new abrasive disk. Nuovo disco abrasivo della 'Behr-Manning'

Anon. *Officina* 1961 Vol 6 (8) p 16 (Apr 30) (In Italian)

This wheel, the 'Vizi-Disc' is of a reinforced synthetic fibre bond in rectangular form with the two short sides rounded off. 2 illustr.

M *Pe Urz*

Honing gear teeth

Anon. *Edgar Allen News* 1961 Vol 40 (464) p 37 (Feb)

The honing of gear teeth after hardening is said to show a considerable improvement in sound-properties of gear motor reduction gears, while at the same time improving their useful life.

B *Adz Chh*

Reviews of machine tools—2 : Grinding and lapping machines

Anon. *Mass Prod* 1961 Vol 37 (7) pp 74-88 (July)

Recently introduced grinding, lapping and honing machines available in Britain are described. 19 illustr.

B *Chc Pr.321/Chd Pr.321/Chh Pr.321*

Liquid polishing composition

Meyers & Ellis Inc, Dept MF, 10 S. LaSalle St, Chicago 3, Ill. *Metal Finish* 1961 Vol 59 (4) pp 77, 79 (Apr)

A liquid metal polishing composition that prevents loading of abrasives, Miracle also acts as a cutting agent, it is claimed, and as an ideal lubricant. It is further claimed that the composition gives grinding wheels, abrasive belts and disks almost twice, and in many cases more than three times the normal life span.

D *Chm Sk*

Lustre and lapidary polishing of metal goods

H. Curti. *Met Rein & Vorbeh* 1961 Vol 10 p 35 (Mar) ; *J iron st Inst* 1961 Vol 199 Pt 1 p 97 (Sep)

A review of modern equipment is included.

D *Bf Chm*

' Precise ' electric jig grinders

Precise Products Corp, Racine, Wisc, USA. Brit Rep: Matbro Machine Tools Ltd, Beddington Lane, Croydon, Surrey. *Machinery, Lond* 1961 Vol 99 (2551) pp 799-800 (Oct 4)

The J series electric jig grinders are for use on jig borers and vertical milling machines. Holes from 0.040 to 3.75 in. diameter can be ground, it is stated, to tolerances well within 0.0001 in., and with surface finishes of less than 10 micro-inches. Equipment available includes a diamond wheel dresser on a magnetic base. 1 illustr.

D *Nj Psf:Az Chc Prd*

Herckelbout spring coiling, grinding and testing machines

R. Herckelbout & Sons, 77 Rue de Noisy, Rosny-sous-Bois (Seine); F. W. Kubach Ltd, Wakefield House, 106 Church Rd, London SE 19. *Machinery, Lond* 1961 Vol 99 (2547) pp 545-546 (Sep 6)

Type MV 3 is a machine for grinding the end faces of compression springs. The resin bonded grinding disks, of 21½ in. diameter, are used to grind springs up to 9½ in. in length. The dressing device can be so adjusted as to produce an angular face on the wheels, with the result that a progressive grinding action is obtained during the first part of the work traverse, the spring being finally passed between parallel faces on the wheels, which control the finished size. 2 illustr.

D *Az Chc Pr Psf*

Modern cutting grinding. Modernes Trennschleifen

Keramische Schleifscheibenfabrik Carl Krebs & Riedel. *Klepzig Fachherichte* 1961 Vol 69 (7) p 270 (July) (In German)

The Krebs-Beri cutting grinding wheel DBPa is said to be able to cut precious metals up to 135 mm in diameter in a dry state without affecting the structure of the surface. 1 illustr. *B* *Chc Pef*

New miniature bearing grinder

Van Norman Machine Co, Div of Van Norman Industries Inc. *Wire Ind* 1961 Vol 28 (333) p 897 (Sep)

Tolerances closer than 50 millionths of an inch, and a finish of approximately 3 or 4 micro-ins are said to have been achieved in the grinding of inner races of miniature bearings on a new precision plunge cut radius grinder, Lectro Cam Model IM.

B *Ayz Chc Pr*

Grinding and lapping carbide tools with diamond wheels

L. K. Petrosyan, N. P. Vvedenskaya. *Machines & Tooling* 1961 Vol 32 (3) pp 31-35 (Original in Russian)

The article gives recommendations as to the most suitable applications of the various kinds of bonded diamond wheels, and publishes the results of the special investigation carried out in 1960 by the VNII (All-Union Scientific Research Institute) into the effect of the concentration of diamond wheels of various grain size on the amount of carbide used, and on the specific expenditure of diamonds in working various types of carbides. The selection of machining conditions with diamond wheels is also discussed. 8 illustr, 2 ref.

K *Al Bk Chc Nv Pr/Al Bk Chd Nv Pr*

New Swiss precision diamond paste

Charles Churchill Co Ltd, Coventry Rd, South Yardley, Birmingham. *Prod Finish* 1961 Vol 14 (2) p 100 (Feb)

Claimed to be suitable for use with sintered carbides, all hardened and unhardened steels, stainless steels, cast iron, all non-ferrous metals, gems, *etc*, X-17 precision diamond paste is now available in the UK in twelve different grain sizes.

D *Bb Chm Km.323/Bf Chm Km.323/ Bkc Chm Km.323*

Microrex No 00 centreless grinder

Fabrications Mécaniques de Précision, Saint-Etienne (Loire), France; Brit Rep: Stanley Howard Ltd, 73 Devon St, Birmingham 7. *Machinery, Lond* 1961 Vol 99 pp 684-685 (Sep 20)

Workpieces up to 1 in. in diameter can be handled on the Microrex No 00 centreless grinder, which will take grinding wheels up to 12 in. diameter × 2⅛ in. wide. The control wheel can be tilted through a maximum of 6° for through grinding operations, and swivelled for taper grinding. There are separate hand-operated diamond dressing attachments for both wheels. 1 illustr. *B* *Chcc Pr:Nj Psf*

Multiple grinding of contours done in single pass

Murray-Way Corp, Birmingham, Mich. *Mach Tool Blue Bk* 1961 Vol 56 (9) pp 190, 192 (Sep)

Flat, formed, or contoured parts, both long and short, can be ground, wet or dry, from roughing to finishing in one pass by these multiple-float abrasive belt heads, it is claimed. *B* *Chcb Pee Pr*

The machine-lapping process

Flexibox Ltd, Trafford Park, Manchester. *Mach Tool Rev* 1961 Vol 49 (292) pp 86-89 (July-Aug)

The process, its capabilities and advantages, and the range of lapping machines are discussed. 7 illustr.

B *Chd Pr.1456.21*

A process of finishing hardened gears

Charles Churchill & Co Ltd, Birmingham 25. *Gear Honing & The Railway Gazette* 1961 p 404 (Apr 7); *Europ tech Dig* 1961 (9) p 73 (Sep)

This new honing method, employing a self-sharpening hone, composed of either silicon-carbide or aluminium-oxide in a plastic bond, is claimed to be more economical than previous methods of removing nicks, burrs and surface scale from heat-treated gears, and to improve the surface finish. 1 illustr.

B *Ad Chh Pgkz.1456*

Reconditioning of worn piston rings

Dana Trading, Vejle, Denmark. *Olsen KV Dansk Teknisk Tidsskrift (Denmark)* 1960 (12) Vol 84 p 259; *Europ tech Dig* 1961 (9) p 75 (Sep) (Original in Danish)

A grinding machine has been produced, capable of reconditioning old piston rings without affecting their shape. 1 illustr. *B* *Aggz Chcz Pr*

Internal thread grinding machine

Rockwell Machine Tool Co Ltd, London NW 2. *Engrs' Dig* 1961 Vol 22 (9) p 105 (Sep)

The Matrix TI 1315 is intended for the accurate grinding on a quantity-production basis of a wide range of nuts and half-nuts of ball track or other forms. A single ribbed grinding wheel, automatically diamond-dressed at preselected intervals, is used. 1 illustr.

B *Abmb Cg Nj Psfz:Chcp Pr*

Spline grinding : Developments in production equipment : Grinding internal splines

Anon. *Aircr Prod, Lond* 1961 Vol 23 (2) pp 58-59 (Feb)

The article describes the application of a Fritz Werner 3.275 series spline grinding machine fitted with an internal spline-grinding attachment. 3 illustr.

B *Az Chc Pr*

LITERATURE REQUESTS

Please quote the page number of the journal which contains the original reference, and the author and title of the article, in all cases.

Optical grinder

S & S Machinery Co, 140 53rd St, Brooklyn 32, NY. *Mod Mach Shop* 1961 Vol 34 (2) pp 160-161 (July)

The Elgin Triscop high precision optical grinding machine is designed for sub-miniature internal, external grinding and lapping work, which is claimed to work to fractions of degrees, and to minimum seconds. Accessories are included to provide for wheel truing.

B *Az Chcs Pr*

Tempo type AS saw blade grinder

Elgar Machine Tool Co Ltd. *Metalworking Prod* 1961 Vol 105 (39) p 79 (Sep 27)

Automatic in-feed of the saw blade to the grinding wheel can be fitted to Tempo AS series grinders which accommodate straight and helical saw blades both for re-sharpening and for cutting new teeth. 1 illustr.

B *Alfz Chc Pr*

Landis Gendron cylindrical grinders

Landis Gendron, SA Villeurbanne (Rhône), France; Brit Rep: Stanley Howard Ltd, 73 Devon Street, Saltley, Birmingham 7. *Machinery, Lond* 1961 Vol 99 (2548) pp 611-612 (Sep 13)

A type ROPA 16.50 angle-head machine was displayed at Brussels, set up for grinding small crankshafts. The machines are primarily intended for plunge grinding operations only, and rapid power traverse and continuous infeed at steplessly variable rates down to 0.00004 in./sec are applied to a sub-slide which carries the wheel head, by a hydraulic motor. The wheel head can be adjusted by a handwheel, or automatically, in increments from 0.0001 to 0.002 in. per table stroke, when the machine is to be employed for traverse grinding. 1 illustr.

B *Agn Chcl Pr*

An optical profile grinder

Anon. *Industr Diam Rev* 1961 Vol 21 (247) pp 118-119 (June)

The Wickman optical profile grinder combines the functions of a universal grinding machine, a 50:1 pantograph, and a projection unit providing the optional use of screen or microscope as an inspection unit. Capacity and features of the machine are described. 2 illustr.

G *Chch Pr Psr/Chch Pr Wcg/Chch Pr Wcm*

BP 858,743 (July 30, 1958—USA) **Corning Glass Works**

Precision grinding

Ogive shaped hollow cones of highly refractory material are used as radomes forming the tips of large ballistic missiles. The blanks cast for such radomes may be 30 in. long, have a diameter of 13 in. and may weigh 50 lbs or more. The thickness of the finished radome must be of extreme uniformity. A plunge type of grinding is employed using a slurry of *eg* silicon carbide in water. A vertical lap is placed inside the blank, the lap having the shape ultimately to be imparted to the article. The tip of the blank is provided with a small aperture for the slurry. Eventually contact is made over the whole inner surface of the blank. Then the radome blank is rotated about its axial centre line and a lap arranged outside again feeding abrasive between lap and blank. The radome is freed by directing pressure between lap and article. 8 claims, 7 illustr.

J *Blg Chcw.1456.545*

BP 859,418 (Feb 6, 1958) **S. Kakiuchi**

Grinding apparatus

A finish grind of high precision is obtained independently of the variations in the surface speed of a workpiece held on the magnetic chuck of a rotating table under a reciprocating grinding wheel by adapting the speed of rotation of the holder to the speed of the longitudinal movement of the grinder. The movement is hydraulically operated and cam controlled. 5 claims, 6 illustr.

J *Chcm Pr.545*

BP 860,084 (Feb 1, 1961) **M. M. Bass, R. M. Bell, L. C. Hammond, P. J. Robischung, Hammond Machinery Builders Inc**

Grinder with oscillating head

In conventional tool grinders it is necessary for the operator to move the tool point manually across the working face of the grinding wheel. This movement is time-consuming and tiring to the operator and grinding accuracy is difficult to obtain. Where the tool is moved relative to the supporting table, wear of the latter will alter the positional relationship between tool and wheel. In the present machine the grinding wheel is caused to oscillate with respect to the table on which the tool is held stationary. The wheel 11, Fig 42, is secured to a shaft 12 mounted in a bracket 13 pivotally supported by a bearing assembly on a platform 15 secured to the machine frame 10. The bracket is oscillated through a linkage 21 by a lever 18 which is rocked about a pivot 116 by a roller 22 on a shaft 26 rotatable at controllable speed by a pulley 25, Fig 43, belt-driven through a speed reducer 28 by a motor 29. The amplitude of oscillation is varied by adjusting the eccentricity of the roller 22 with respect to the axis of rotation of the pulley 25 by a mechanism 24 operated by a handle 23. The shaft 12 is belt-driven by a motor 17 mounted on a pivoted support 109 and is free to

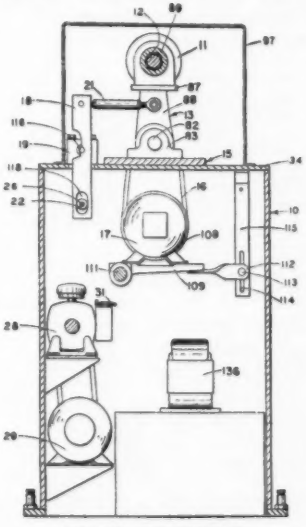


Fig 42. BP 960,084.

DIAMOND TECHNOLOGY

First published 1942 as "Production Methods for Diamond and Gemstone." The second edition of this book by P. Grodzinski has been revised throughout and considerably enlarged. 840 pages, 486 illustrations, 94 tables, and indexes. From NAG Press Ltd., 226 Latymer Court, London W 6. 55s, post free.

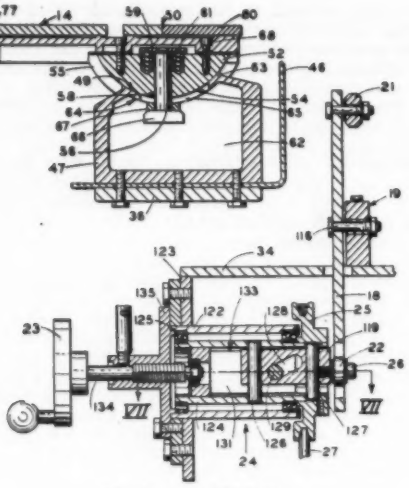


Fig 43. BP 860,084.

move during the accurate movements of the shaft. Another mechanism for oscillating the wheel is illustrated. 19 claims, 18 illustr.
H *Chc Pr Qnj.545*

USP 2,968,132 (Sep 18, 1956) **R. L. Hazelton, Omni American Engng Co**

Magnetostrictive grinding machine

Smoother and more rapid abrading is effected by a combination of an oscillatory or vibratory motion and a rotory motion perpendicular to the first motion. The motions may both be imparted to the grinding wheel or the wheel rotated and the workpiece oscillated. The shaft of the grinding wheel may be made of magneto-strictive material *eg* a nickel rod or tube surrounded by a stationary winding allowing free rotation of the shaft. A high frequency electric current is used to produce the oscillations, a fly wheel may be attached to the shaft to dampen the vibration. 2 claims, 8 illustr. Ref cited : 8 USP. *J* *Chcz Pr.545*

USP 2,968,134 (Oct 9, 1959) **T. G. Lewis, E. I. Du Pont de Nemours & Co**

Manufacture of precision cones

Circular optical cones, (*eg* for bore interferometry) made of fused quartz or the like, are difficult to produce because of the high accuracy standards required : included angle ±2 sec. of an arc, circularity ±1 micro-in. radially, straightness ±1 micro-in., surface finish approx 0.25 micro-in. r.m.s. The cone is prepared by grinding, then lapped in full-contact lapping using a rouge suspension in water in conjunction with an optical pitch lap until all grinding marks are removed. Finishing takes up many hours during which the cone is repetitively and alternately subjected to full-contact and to a line-contact lapping with a rouge suspension in water in conjunction with an optical pitch lap, in successive steps ranging from approx 30 min. to approx 5 min. each, for full-contact lapping and line-contact lapping, until the quality of the cone is brought up to standard. The preparation includes conventional optical milling of the blank with a diamond tool leaving approx 0.01 in. material for the finishing operations. The cone is then ground in a fixture which is trued to an optical flat surface by conventional lapping technique using a cast-iron lap and a graduated series of diamond abrasives, as precise mounting is a condition for obtaining the desired accuracy. The grinding of the cone is carried out with a series of diamond wheels (Norton D-150-J-100-B to final D-600-S.N-100-B). 9 claims, 8 illustr. Ref cited : 4 USP. *J* *Az Bm Chd.545*

USP 2,969,622 (Nov 25, 1957) **M. Gogol**

Means for reproduction of master shapes

This refers to an airfoil grinding machine for exactly duplicating master airfoil cams and jet engine blades. Hitherto special master cams have to be formed that will compensate for errors in the machinery used, and which must be carefully hand-finished to the exact dimensions required. Further true copies of the master cam are not made and thus wear can only be ascertained with special testing equipment. The problem of less costly production of master cams and their duplicates has been solved by a lathe having a distance between centres greater than the combined length of master cam and workpiece. A guide and

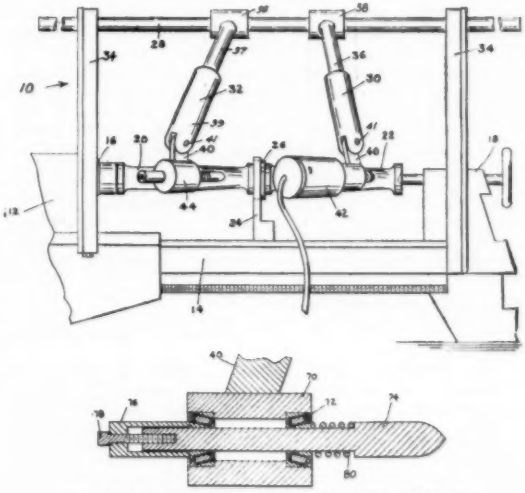


Fig 44 (top) and 45 (bottom). USP 2,969,622.

timing assembly is arranged in axial alignment with the axis of the lathe carrying a cam grinder assembly and a cam follower assembly. In parallel alignment are carried a carbide stylus and a diamond truing tool corresponding to cam grinder and cam follower assembly so that, by periodical truing of the grinder, exact duplication of the master cam can be accomplished. Fig 44 is a slide elevation of the machine with cam follower 44 on master cam 20 and motor driven grinder 42 on workpiece 22. The truing arrangement is represented in Fig 45. 52 is the carbide stylus, 54 the diamond truing tool. 8 claims, 6 illustr. Ref cited : 4 USP ; 2 DBP.
J *Ab Cgh Nj Psf:Az Chc Pr.545*

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Swiss P 349,185 (Dec 28, 1956) **E. Fouquet**

Grinding machine. Machine à meuler

The machine illustrated in Figs 46 and 47, which together constitute a lateral part sectional view thereof, comprises a rotary mill-grinding wheel operating on a workpiece P, rotated in the opposite direction, so that metal is removed from the workpiece at high speed

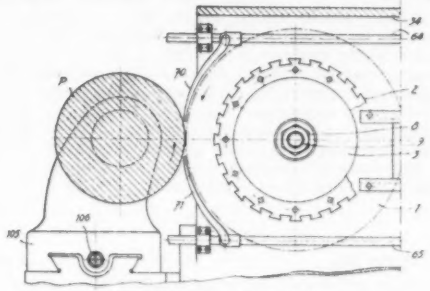

Fig 46. Swiss P 349,185.

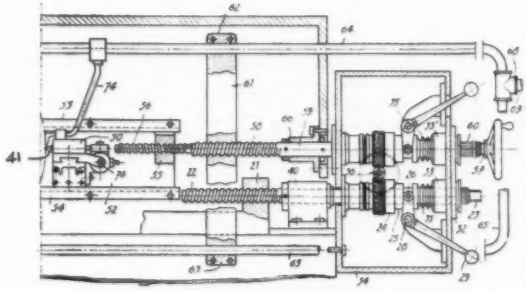

Fig 47. Swiss P 349,185.

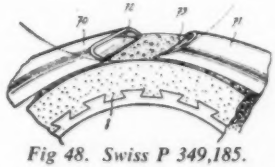

Fig 48. Swiss P 349,185.

and in large quantities in the form of relatively long and narrow shavings. During the operation the wheel 1, which is composed of very hard abrasive grains in a resinoid binder, is trued by a diamond cleavage tool 41 and is provided with lubricant through spouts 70, 71 connected through conduits 64, 65 to a supply source. The wheel 1 is fed towards the workpiece P by means of a screw spindle 22 which engages a nut 21 on a carriage to which the wheel is fixed. As the wheel diameter is reduced the spouts 70, 71 and the tool 41 are moved towards it by screw spindles 58, 56 of equal and opposite pitch engaging respectively a cross member 61 to which the pipes 64, 65 are secured and a carriage 52 on which the tool 41 is mounted. The spindles 22 and 56, 58 are mounted on shafts 23, 57 driven by a common spindle operated by a fluid motor, or independently by hand after declutching. The tool 41 is reciprocated parallel to the wheel axis by a fluid motor. The spouts 70, 71 are shaped as shown in Fig 48 with their outlets 72, 73 inserted as close as possible to the contact zone between workpiece P and wheel 1. 10 claims, 10 illustr. *H* *Chc Pr.545*

Swiss P 350,215 **K. Lau, Ernst Winter & Sohn** (Jan 26, 1956—Germany)

Grinding or lapping wheel. Schleif- oder Läppscheibe

Resilient supports for diamond lapping disks have hitherto been provided by helical springs, resilient bowed wires or intermediate rubber layers These arrangements are subject to fatigue, and adjustment is not simple. The problem has been solved by a support, making use of an axially resilient diaphragm, easily

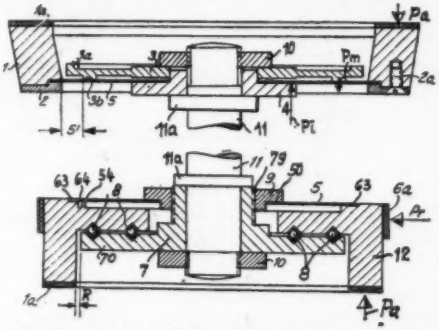

Fig 49 (top) and 50 (bottom). Swiss P 350,215.

adjustable by a tension ring. In Fig 49, 1 is an annulus with the abrasive layer 19. It is supported by diaphragm 5 made of spring steel and tensioned by ring 3 under pressure of nut 10. Fig 50 shows a lapping disk with two diamond layers 1a and 6a carried on ball bearings 8 the pressure being resiliently transmitted by diaphragm 5. 4 claims, 5 illustr.

J *Chc Nv.545/Chd Nv.545*

Swiss P 351,518 **W. Osenberg, Bisterfeld & Stolting** (Oct 24 and 28, 1955—Germany)

Method of machining plane and curved surfaces of metal bodies and tool for carrying out the method. Verfahren zum Bearbeiten planer und gewölbter Flächen metallischer Körper sowie Werkzeug zur Ausübung des Verfahrens

This is a melt-abrading method carried out with a knurled tool rotating at such a high speed and exerting such pressure combined with such a feed that the material is removed by melting and burning off. The tool is characterised by spaced concentrically arranged

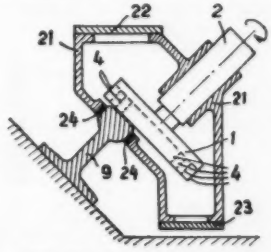

Fig 51. Swiss P 351,518.

annular ribs with a knurled edge as the abrading face. The method may be combined with grinding by loose abrasive or by spark-erosion. Fig 51 shows the melt-abrading of railway rails. The tool 1 on spindle 2 is provided with two knurled rings 4 running in a closed container 21 filled with abrasive grains. 13 claims, 14 illustr. *J* *Ab Cs Ur.545*

FP 1,239,056 (Apr 20, 1959—USA) **F. L. Christensen, Christensen Diamond Products**

Device for cutting by abrasion. Dispositif découpeur par abrasion

A wheel, Figs 52 and 53, for cutting abrasive coarse aggregates such as concrete and brick consists of

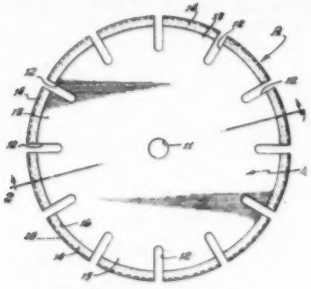

Fig 52. FP 1,239,056.

Fig 55 (left) and 53 (right). FP 1,239,056.

abrasive segments 14, 15, comprising diamonds in a matrix of tungsten or tungsten carbide, secured as by brazing on opposite sides of the rim 18 of a steel support 10 provided with radial slots 12. The peripheral surfaces of the segments project beyond the peripheral

Fig 54 (left), 56 (centre), and 57 (right). FP 1,239,056.

surface of the rim 18 so that a stabilizing rib 26 is formed in the bottom of the groove 24 made by the wheel in the workpiece W. The surfaces may alternatively be flush but the rate of wear of the rim 18 being faster than that of the segments, the rib 26 is still produced. Fig 54 illustrates a wheel for cutting five dense aggregates such as marble, glazed tile, slate,

Fig 58. FP 1,239,056.

granite and onyx, the segments 14a, 15a being separated by gaps 30, 31 which are within the confines of the slots 12 but out of alignment. In Figs 55 and 56 the support 10b has no radial slots and the segments 14b, 15b are staggered. In Fig 57 the segments 14c, 15c overlap axially of the wheel. Fig 58 illustrates a tool for cutting cores from concrete. It consists of a rotatable cylindrical support 51 to which is brazed a bit 50 comprising rings 52, 53, 54 of diamond impregnated matrix separated by steel reinforcing rings 55, 56. 14 claims, 16 illustr.

H *Ba Cej Ng.545*

DAS 1,102,001 (Jan 28, 1958) **E. Hurst, Rexall Drug Co**

Synthetic resin bonded grinding body. Kunstharzgebundener Schleifkörper

The danger of bursting has so far not been overcome by present known methods, *eg* by insertion of reinforcing layers of textiles, fibres, or wires. In order to improve the strength and grinding efficiency a material which easily burns off is added to the reinforcing layers, so that this layer is destroyed near the working surface to a depth of not more than 0.8 mm, (usually not more than 0.4 mm) without effecting the reinforcement itself. An easily oxidisable metal or another pyrophorous material is suitable such as magnesium, aluminium or zirconium. Glass fibres or polyamide fibres in the reinforcing layers may be coated with magnesium powder. 3 claims, 7 illustr. Ref cited : 1 DAS ; 1 Austrian P ; 1 BP ; 4 USP.

J *Pe Urb.545*

DAS 1,101,209 (Nov 27, 1953) **E. Fouquet**

Method and device for copy-grinding three-dimensional surfaces. Verfahren und Vorrichtung zum Kopierschleifen räumlicher Flächen

The axes of the copying roll and the grinding wheel are parallel and inclined to the axis around which template and workpiece revolve. The wear of the grinding wheel is compensated for by the axial feed of the grinding wheel so that the distance between copying point and grinding point remains unaltered. At the same time the grinding edge is trued by a diamond. Fig 59 shows the copy-grinding of a turbine blade 3 using template 1. Axis 8 of the copying roll is inclined

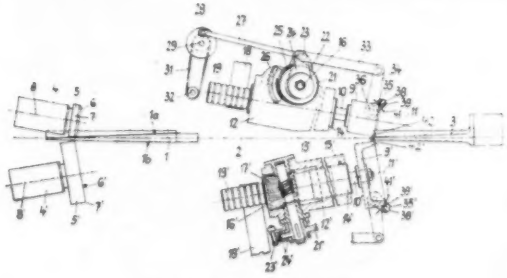

Fig 59. DAS 1,101,209.

to the direction of movement of template 1. Grinding wheel 9 is continuously trued by diamond truing device 38, 39. 9′ is a second grinding wheel represented in a simplified manner which does not quite correspond to the actual arrangement. Wheels 9 and 9′ are fed in the direction of their axes 11 and 11′ through worm gears 16, 17 and 16′, 17′ and pawl and ratchet mechanisms 21, 22, 21′, 22′. 2 claims, 2 illustr. Ref cited : 1 FP ; 2 BP ; 2 USP.

J *Az Chcz.545*

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DAS 1,103,181 (July 21, 1955) **W. Bellow, Licentia Patent-Verwaltungs GmbH**

Electric tool, in particular angle grinder with ventilating wheel immediately disposed behind the grinding wheel on the wheel shaft. Elektrowerkzeug, insbesondere Winkelschleifen mit auf der Arbeitswelle unmittelbar hinter der Schleifscheibe angeordnetem Lüfterrad

The problem of heat extraction in electric tools with high specific loads has led to designs in which the cooling air stream first flows parallel to the grinding wheel shaft, then is deviated radially outward between grinding wheel and hood. In order to avoid the change in direction which lowers the cooling effect it is suggested that the grinding wheel be provided with openings so that the whole cooling air passes through these openings. A shroud around the ventilator prevents radial escape of air. The grinding wheel itself may be designed as a ventilating wheel. 5 claims, 3 illustr. Ref cited : 1 DAS ; 1 Swiss P ; 1 USP.

J *Chcz Prd Pscz.545*

MACHINING PROCESSES AND DEVELOPMENTS

Machining of metals by electro-erosion

Anon. *Ing & Indust* 1960 Vol 27 pp 103-110 (June) ; *J iron st Inst* 1961 Vol 197 Pt 2 p 171 (Feb) (Abstr) (Original in Spanish)

The principles and practice of spark cutting methods are described. Machine tools for this work are illustrated. *D* *Bf Ceqn*

Technological machinings by electro-erosion Pt II

G. B. Gamondi. *Ing Mecc* 1960 Vol 9 pp 27-31 (June) ; *J iron st Inst* 1961 Vol 197 Pt 1 p 92 (Jan) (Abstr)

The conclusions drawn from a comparative sharpening test using WC-tipped tools which compared a wheel with an electro-erosion method, is that there is no marked difference between the two in quality, but that the electro-erosion method was more economical.

D *Al Bkcb Ceqn*

Electrical discharge machine designed for large work

Easco Products, Ypsilanti, Mich. *Mod Plast* 1961 Vol 38 (9) p 56 (May)

Moulds up to 3 × 4 ft in size can be handled by the Die-Matic electrical discharge machine. Said to be the largest electrical discharge machining unit available, it can remove metal on roughing cuts at a rate of 6 cu in. per hour. Cutting electrodes as heavy as 500 lbs, as well as fine electrodes 0.005 in. in diameter can be used. Ratio of metal-to-electrode wear in the roughing operation ranges from 30 : 1 to 50 : 1. The operation is fully automatic, and one man can attend to four machines. 1 illustr. *B* *Ceqm Pr Ptc*

Electrochemical machining : Developments in electro-shaping techniques : Extension of applications

Anon. *Aircr Prod, Lond* 1961 Vol 23 (2) pp 68-72 (Feb)

In this technique an electrolyte is used to induce a high amperage to pass between a cathode tool and an anode workpiece, which is caused to be electrolytically dissolved. The process is stated to be equally suitable for fine work or heavy-duty applications. 9 illustr.

B *Ceqp.132*

Electroshaping : Electrochemical machining developments : Production of gas turbine blades and forging dies

Anon. *Airc Prod, Lond* 1961 Vol 23 (3) pp 88-96 (Mar)

Electrochemical machining is akin to electropolishing and, because of the increase in metal removal potential that it makes possible, has considerably wider applications than the earlier process. For almost any type of profiled work, tooling and production can be undertaken, often, it is claimed, with substantial savings in time and cost. 15 illustr.

B *Aq Ceqp/Ax Ceqp*

Technological processes in electric-spark cutting of hard alloy parts

A. V. Lapshin. *Izv vys ucheb zav ; prib* 1960 Vol 3 (3) pp 108-116 ; *Library of Congress Mthly Index Russ Access* 1961 Vol 14 (4) p 952 (July) (In Russian)

D *Bfxz Ceqm.21*

Electrolytic grinders machine hard materials

Hammond Machinery Builders Inc, 1661 Douglas Ave, Kalamazoo, Mich. *Tool mfg Engr* 1961 Vol 47 (2) pp 101-102 (Aug)

Additions to a line of oscillating electrolytic grinders are Models EGD-12 and 14. With duplex infeed tables, these models are especially suited for steel and super-alloy parts as well as carbide tools. Grinding with these machines is burrless and workpieces are free from metallurgical damage, it is claimed. The grinders accommodate 12 and 14 in. diameter wheels. 1 illustr.

D *Ba Chcr Pr*

A new electrochemical polishing technique

Bell Telephone Laboratories, NJ. *J sci industr Res* 1961 Vol 20A (7) p 396 (July)

A new electrochemical polishing technique for polishing germanium and silicon wafers for transistors is said to be more efficient than conventional methods. On mechanically polished surfaces, it is said, distinct scratches show under a magnification of 500 X, whereas slices polished under the new technique show no texture that can be associated with surface roughness even under electron-microscope examination at 53,000 magnification.

E *Az Bfr Chmkz.1456/Az Bhc Chmkz.1456*

Chemical machining : Some problems of application in the North American B 70 Airframe

Anon. *Aircr Prod, Lond* 1961 Vol 23 (4) pp 138-141 (Apr)

In the North American B 70 Mark 3 aircraft, chemical machining has been extensively adopted for the manufacture of the honeycomb structure facing sheets and for many other operations to the airframe. This method has been necessitated by the characteristics of the heat resistant and corrosion resistant alloys used, which largely preclude the application of traditional machining methods. 5 illustr.

B *Az Ceqp*

Pitting glass by etching to form optical lenses. Ätzgrübchen auf Glas als optische Linsen

K. Peter. *Umschau* 1961 Vol 61 (14) pp 420 (July 15) (In German)

Depressions can be made in perfectly smooth glass using a Vickers diamond indenter, as in hardness testing. The indentation can then be etched using a dilute acid (1-5%) and a perfectly symmetrical lens is formed, the curve of which can be controlled by the length of etching, it is claimed.

B *Az Bm Cv Nde/Bm Cz Nde Scb*

Hot machining : Increased tool life from raising workpiece temperature

B. Jens, L. Wennberg, C. L. Mehl, E. J. Krabacher. *Aircr Prod, Lond* 1961 Vol 23 (7) pp 246-252 (July)

Hot machining can now be applied to increase production when machining high strength and thermally-resistant metals. 18 illustr, 5 ref.

B *Bfz Ceqz*

New machining methods needed for heavier space-age materials

K. Sparling (Lockheed Aircraft Corp). SAE Paper No SP-333 ; *SAE J* 1961 Vol 69 (3) pp 74-76 (Mar)

This is a survey of current metal removal techniques, pointing out the pros and cons of each method. Thermal machining, it is claimed, gives promise of greater metal removal rates and longer tool life using conventional equipment. 7 illustr.

D *Bf Ceq.1456*

Hole finishing : Use of oversize high-precision balls : the 'Ballizing' process

Industrial Tectonics Inc, Ball Div. Brit Rep : Insley Industrial Supply Co Ltd, 21/22 Poland St, London W 1. *Aircr Prod, Lond* 1961 Vol 23 (1) pp 36-38 (Jan) ; *Automobile Engr* 1961 Vol 51 (1) p 17 (Jan)

The 'ballizing' process is described, in which a ball is forced through a bore, thus burnishing it. Materials best suited to this process, in order of suitability, are powdered materials (such as sintered iron, sintered brass and other soft materials) ; aluminium, brass and bonze, mild steel ; high carbon and alloy steel ; stainless steel and other nickel alloys. Tungsten carbide or diamond-boring is said to be the best method of hole production. 4 illustr.

B *Az Chmz Rn Tz/Cfd Nf/Cfd Pdc*

BP 859,341 **Agie AG für Industrielle Elektronik** (July 5, 1957—Switzerland)

Drives for the electrode in electro-erosively operating machine tools

The drive permits axial displacement of the electrode holder, rotation of the holder independently of its axial position, slow and rapid feed of the holder towards the workpiece, erosive grinding by the use of two clutch systems and two independently operable driving systems, each of which may be connected to rotate a driving shaft and a guiding spindle by means of one of the clutch systems. The drive may include a differential system by two motors adjustable independently of one another. The combination of vertical and rotary movements facilitates the production of threads or spiral shapes, *etc.* 7 claims, 5 illustr.

J *Chcr.1456.545*

DAS 1,100,203 (Sep 17, 1953) **C. Ballhausen, Deutsche Edelstahlwerke AG**

Feeding device for the automatic control of the spark gap in metal working machines using the spark erosion method. Vorschubeinrichtung zur selbsttätigen Regelung der Funkenstreckenlänge in Metallbearbeitungsmaschinen nach dem Funkenerosions-prinzip

The device operates with an electric motor controlled by the spark gap, which causes rotation of a screw with two spaced friction disks between which a friction wheel is arranged on the motor shaft. The motor shaft is pivotably mounted and subjected to two electromagnets for swinging to one or the other side in order to make contact with one or the other friction disk. Thus the electrode may be raised or lowered without changing the direction of rotation of the motor. 2 claims, 1 illustr. Ref cited : 2 DBP ; 1 DAS ; 2 USP ; 2 periodicals.

J *Ceqmb Pr Wp.545*

DAS 1,100,205 **H. E. de Bruijn, NV Philips' Gloeilampenfabrieken** (Feb 27, 1958—Netherlands)

Device for electro-erosion with an axially vibrating electrode. Vorrichtung zur Elektro-Erosion mit in Achsrichtung vibrierender Elektrode

Known arrangements are designed with a resiliently suspended and friction slideable guiding device moved by a cam, with the periodic movement of the electrode towards the workpiece controlled by an electromagnetic device. This device operates with a frequency of 50 c/s and thus limits the cutting speed to this frequency. This disadvantage has been overcome by a circuit arrangement in which the electromagnetic device is fed with a current of substantially lower frequency than the frequency of electrode current *ie* independent of the mechanical vibration frequency. The cutting speed can thus be increased up to 50 times the speed of the previous circuit arrangement. 4 claims, 2 illustr. Ref cited : DBP 1,078,857.

J *Ceqn Psc Ptc.545*

DAS 1,102,311 (Sep 10, 1959) **J. Schulz, R. Sattler, Deutsche Edelstahlwerke AG, AEG**

Device for the electro-erosive production of threaded holes in workpieces. Vorrichtung zur elektroerosiven Herstellung von Gewindedurchbrüchen in Werkstücken

This refers to the guiding mechanism for the electrode which, in previous devices, has been guided by a relatively low nut. This has been insufficient because of the lateral forces to which the electrode is subjected at its upper end. In the new device the electrode is guided by two segmental guiding elements one above the other at a distance greater than the electrode diameter. Carbon contacts resiliently pressed against the electrode feed current to the electrode. Two guide pins driven by an electric motor controlled by the spark gap resiliently engage a disk fixed to the electrode. 1 claim, 3 illustr. Ref cited : 1 DBP ; 1 DAS ; 1 USP ; 1 period. 1953 ; 1 book.

J *Az Ceqn Psc.545*

PRODUCTION, GRADING & RECOVERY OF ABRASIVE PARTICLES

Introducing standards in the abrasives industry

P. A. Gavrilov. *Standartizatsiia* 1961 Vol 25 (4) p 35 (Apr) ; *Library of Congress Mthly Index Russ Access* 1961 Vol 14 (4) p 884 (July) (In Russian)

D *Rd.25.255*

Simple method developed for the recovery of industrial diamonds

Anon. *Industr Diam Rev* 1961 Vol 21 (243) p 34 (Feb)

A relatively simple and effective system for the reclamation of industrial diamonds from machine wiping cloths is described.

D *Hw.1456*

TOOL PRODUCTION

The manufacture of high speed cutting tools for automotive and allied industries

G. C. Lovitt. *IAAEJ* 1960 Vol 20 pp 76-81, 87 (June) ; *J iron st Inst* 1961 Vol 197 Pt 1 p 92 (Jan) (Abtsr)

D *Cegz Pd Pc*

Manufacturing diamond drill bits

Anon. *Colliery Engng* 1961 Vol 38 (447) pp 194-198 (May)

The production of diamond drill bits at the factory of L. M. Van Moppes & Sons (Diamond Tools) Ltd. The process is described in a fair amount of detail, including the sorting of the diamonds, bit manufacture, and the resetting of used bits. Recommendations are made for bit selection, and their proper and economic use. 6 illustr. 2 tables. *B* *Nhb Qc*

Manufacturing of tools, especially hob milling tools. Die Werkzeugfertigung unter besonderer Berücksichtigung der Herstellung von Wälzfräsern

J. Stern. *TZ f prakt Metallbearb* 1961 Vol 55 (8) pp 396-398 (Aug) (In German)

Following a summary of the material to be selected, the most important operations, such as relieving, relief slotting and shaping, as well as the various kinds of relief grinding jobs are discussed. Finally, the testing methods available during production are dealt with. 9 illustr. *B* *Alc Ceq*

Using straight and reverse tooth generation in the manufacture of cutting tools

A. L. Rosin, V. A. Revenko. *Library of Congress Mthly Index Russ Access* 1961 Vol 14 (4) p 1016 (July) (In Russian)

Book, Tsentr biuro tekhn informatsii, Sverdlovsk, 1959, 40 pp.

[Not in library of Industrial Diamond Information Bureau]. *D* *Pd Qc.21*

Machine tools for cutting-tool production

A. A. Kudriashov. *Library of Congress Mthly Index Russ Access* 1961 Vol 14 (4) p 1010 (July) (In Russian)

Book, Gos nauchno tekhn izd-vo-mashinostroit lit-ry, Moscow, 1961, 318 pp.

[Not in library of Industrial Diamond Information Bureau]. *D* *Pd Qc:Pr*

POWDER METALLURGY

Sintering of oxide and carbide-metal compositions in presence of a liquid phase. Frittage d'oxydes et de compositions carbure-métal en présence d'une phase liquide

W. D. Kingery, E. Niki, M. D. Narasimham. *J Amer ceram Soc* 1961 pp 29-35 (Jan); *Verres et Réfr* 1961 Vol 15 (3) pp 149-150 (May-June) (Original in English, Abstr in French)

Observations of micro-structure changes in several systems and rate of densification during sintering of magnesium oxide, titanium carbide, and tungsten carbide in the presence of a liquid phase indicate that the densification rate is controlled by diffusion through a liquid film between particles. Dependence of the sintering rate on time, particle size, and temperature are in agreement with predictions. Theoretical estimations of the sintering rate are in reasonable agreement with experimental measurements.
B *Bk Cql/Bz Cql*

Experiences with machine parts made with powder metallurgy

A. Pokorný. *Hutn List* 1961 Vol 16 (7) pp 497-503 (July) (In Czech)

11 ref, 20 illustr, 2 tables.
D *Ps Qc Qt*

Powder metallurgy

J. S. Jackson (Assoc Electrical Industries Res Lab, Rugby). *Rugby Engng Soc Proc* 1959-1960 Vol 50 pp 16-40; *Metal Powd Rep* 1961 Vol 15 (11) pp 203-204 (July)

An informative review of the main topics in powder metallurgy is given, it is stated, including recent developments. The manufacture of sintered carbide cutting tools is described.
D *Pdc Qc/Vwlb.132*

MISCELLANEOUS

Engineering, Marine, Welding and Nuclear Energy Exhibition

Anon. *Industr Diam Rev* 1961 Vol 21 (245) pp 73-74 (Apr)

Among exhibits of interest were a diamond pyramid hardness tester, type 6406, shown by W. & T. Avery Ltd, and two on-the-spot testers using diamond indenters, the Pentrascope and the Indentometer, shown by Ingersoll Locks Ltd, Indus Div. A. & S. Osmond's machines for cutting metallurgical specimens did not use diamond cutting disks but were claimed to produce a high order of finish on cut specimens. Other tools described are the Marwin (Anstey) Ltd taper-shanked tungsten reamer, the 'Maxi-Life', and Airtools and Accessories Ltd 'Bux' magnetic drill press. 4 illustr.
G *Bfa Ceg Pr.27.321/Cvd Nde Wghc.27.321*

Application of industrial diamonds V: Clamping tools for dressing diamonds

H. J. Otterloo. *Industr Diam Rev* 1961 Vol 21 (247) pp 106-117 (June)

The growing use of dressing diamonds in tool making has led to an increased number of types of clamping tools. New developments include the clamping of tools so that they do not vibrate and an extension of the use of diamonds for dressing work. The constructions of simple and more complicated clamping tools are described and setting up and using the diamond for convex, concave and profile dressing explained.

The article also deals with some other common uses of diamond in industry, including diamond as a cutting tool, as a wire drawing die, and for measuring hardness. The 'Diprofil' appliance, by means of which a high polish can be obtained on dies for forming plastics, glass, *etc*, and which is also used for filing, lapping, engraving and many other operations, is described in detail. The article ends with a review of the uses of diamond powder for lapping and polishing. 42 illustr.
G *Cgf Nj.1451/N.1451*

Utrecht Spring Fair, 1961

Anon. *Industr Diam Rev* 1961 Vol 21 (246) p 98 (May)

There were few exhibits of interest to those concerned with diamond tools, but the stand of D. Drukker & Zn, NV, of Amsterdam included both a static show of rough diamond, diamond tools and polished diamonds, and demonstrations of machines using diamond tools. 1 illustr. *G* *Fb.27.324/N Pr.27.324*

Diamond city

T. Ilatovskaia. *Smena* 1961 Vol 38 (2) pp 4-6 (Jan); *Library of Congress Mthly Index Russ Access* 1961 Vol 14 (4) p 1021 (July) (In Russian)
D *F Hd.332*

Gear wheels in plastic. Zahnräder aus Kunststoff
H. H. Reinsch. *Maschinenwelt u Elektrotechnik* 1961 Vol 16 (10) pp 455-459 (Sep) (In German)

The manufacture of gear wheels from plastic, the advantages they display over metal gear wheels, and their machinability are discussed. 5 illustr.
B *Ad Bp Qc*

FP 1,240,869 **NV Philips' Gloeilampenfabrieken** (Nov 13, 1958—Netherlands)

Method of diamond bonding. Procédé de soudage sur du diamant

Mounting diamonds on metal holders by brazing with a titanium alloy, for example in the manufacture of chisels, drills or pick-up styli, ensures a homogeneous distribution of titanium in the joint so that the formation of brittle spots is avoided. A satisfactory joint is, however, difficult to obtain due to contamination of the alloy by most materials used in the construction of crucibles in which the alloy is melted. alloy in crucibles made of molybdenum and/or tungsten which have been found not to contaminate deleteriously the molten alloy. The alloy consists of titanium and silver and/or copper which are melted under vacuum or in an inert gas. The diamond, which may be roughened by heating in an oxidising atmosphere, is clamped on a metal holder, preferably of molybdenum and/or tungsten, and is dipped in the molten alloy. The excess of alloy is ground off and the diamond is ground to the desired shape. 8 claims.
H *F Lfd N.545*

Industrial Diamond Association Annual Convention
Anon. *Industr Diam Rev* 1961 Vol 21 (245) p 77 (Apr)

Papers read at the Convention are listed and subjects under discussion mentioned.
G *Fc.243:.231.535*

Slideway wear factors in machine tools
R. C. Brewer (Imperial College of Science & Technology). *Engng, Lond* 1961 Vol 192 (4970) pp 84-85 (July 21)

The effect of surface preparation, hardness and microstructure is described. 6 illustr, 6 ref, 1 table.
D *Pr Unr*

Diamond tools safeguard jobs
Anon. *Industr Diam Rev* 1961 Vol 21 (243) p 34 (Feb)

The extensive use of diamond tools and finishing compounds in a small firm producing specialized products has, it is claimed, significantly contributed to the firm's very existence in the age of the large concern.
D *Chm Kmg.145/N.145*

PATENT LISTS

BRITISH

The Official Journal (Patents) 1961 (3790) (Oct 4)

882,827 PICANOL, J. Machines for cutting bevel, hypoid and similar gears.

882,828 PICANOL, J. Machines for cutting bevel, hypoid and similar gears.

882,829 PICANOL, J. Tool for cutting bevel gears, hypoid and similar gears.

882,999 HOULDSWORTH, J., JONES & SHIPMAN LTD, A. A. Devices for truing grinding wheels.

882,859 ARMYTAGE, F. W. Machine for abrasive finishing of contoured or profiled surfaces.

882,793 LUBBOCK, I., ALORIX LTD. Grinding machines.

883,108 AMERICAN VISCOSE CORPORATION. Elastomer bonded abrasive materials.

882,992 SVENSKA DIAMANTBERGBORRNINGS AB. Apparatus for determining the orientation of drill cores.

The Official Journal (Patents) 1961 (3791) (Oct 11)

883,544 POKORNY, E. A. Reclaiming, concentration or purification of diamond in waste or raw material.

The Official Journal (Patents) 1961 (3792) (Oct 18)

884,204 MINNESOTA MINING & MANUFACTURING CO. Abrasive articles comprising adhesive bonded fibrous materials.

883,955 NORTON CO. Dimensionally stabilized paper in the production of abrasive coated sheets.

884,042 ROWLAND & CO LTD, F. E. Grinding machines.

The Official Journal (Patents) 1961 (3793) (Oct 25)

884,502 DIONISOTTI, J. Rock drilling tool.

UNITED STATES

Official Gazette 1961 Vol 770 (1-4) (Sep)

2,998,676 C. A. HAWKINS. Precision lapping device.

2,998,678 H. D. BELOCK, J. W. TONE, BELOCK INSTRUMENT CORP. Method and machine for grinding gears.

2,998,680 M. S. LIPKINS. Lapping machines.

2,998,736 F. J. CLOUTIER, V. MILEWSKI, VALERON CORP. Tool mounting for boring bar.

2,998,812 W. M. COOPER, CHAMPION MFG CO. Cutting machine.

2,998,813 H. R. WILSON. Masonry saw.

2,999,429 L. O. CARLSEN, GLEASON WORKS. Drive of gear generating machine.

LITERATURE REQUESTS
When applying for the loan of literature abstracted in this journal, please quote the title of the article, the name of the author, and the number of the page on which it appeared.

2,999,493 O. E. BLAIR, STASET CO. INC. Diamond dressing tool.

2,999,541 R. B. KINZBACH, W. STRECKER, KINZBACH TOOL CO. INC. Milling tool.

2,999,742 R. SCHUSTER. Grinding blocks.

3,000,087 C. H. DYER, WESTERN ALLOY PRODUCTS CO. Sintered tungsten carbide alloy product.

3,000,147 M. J. CELOVSKY, INDUSTRIAL TOOL ENGNG CO. Contour grinder.

3,000,148 H. F. BOVENSIEPEN. Two-lap lapping machine.

3,000,150 O. E. HILL, NORTON CO. Grinding machine.

3,000,336 A. E. R. E. BAUER, A. B. MALENS HOLMQUIST. Automatic control device for centerless grinding machine.

3,001,337 E. R. DUNN, GARDNER MACHINE CO. Opposed disk grinder with co-ordinating feed control.

3,001,455 S. ISHIOKA, G. MATZETMOTO, M. AKEYAMA, HITACHI LTD. Automatic bevel gear tooth generating machine.

3,001,778 H. TOMITÄ, R. J. BRESHEARS, E. E. BRESHEARS. Concrete pavement joint cleaner.

SOUTH AFRICAN

Official Journal 1961 Vol 1 (13-17) (Aug-Sep)

61/1218 H. P. BOVENKERK, GENERAL ELECTRIC CO. Etched man-made diamond and method for production thereof.

61/1978 S. MESSERSCHMIDT. Method of and apparatus for grinding of balls, in particular ball bearing balls.

61/1696 P. R. THOMAS, CARBORUNDUM CO. Method and means for dressing grinding wheels.

AUSTRALIAN

Official Journal 1961 Vol 31 (30-33) (Aug-Sep)

234,759 E. J. LONGYEAR CO. Wire line deep core drilling apparatus.

235,030 SIEMENS EDISON SWAN LTD. Cutting of semi-conducting material.

SWISS

Patentliste 1961 (16-17) (Aug-Sep)

356,483 A. SCHEUCHZER. Device for grinding the carrying surface of two railway rails at the same time.

356,602 F. PAPKE, VOIGTLÄNDER AG. Optical arrangement for projection and image mirroring on chip producing machine tools.

356,652 H. MERZ, LANDIS & GYR AG. Bearing for precision instruments.

356,726 INSTITUT DR. ING REINHARD STRAUMANN AG. Article exposed to friction.

357,001 T. SACHS. Method for making flexible and non flexible grinding and cut-off wheels.

FRENCH

Bulletin Officiel 1961 Vol 2 (39-42) (Sep-Oct)

76,280/1,206,732 H. M. HOBSON LTD. Grinding method and machine for carrying out this method.

1,273,068 L. A. WILLIAMS, ANOCUT ENGNG CO. Electrolytic removal of material.

1,273,080 K. H. WAGNER. Rod of artificial plated material for grinding or sharpening tools.

1,273,189 C. J. PAUL. Grinding wheel truing roll with multiple diamonds.

1,273,100 L. MAYER. Tool head for devices for shaping and polishing hard materials such as stone, marble and the like.

1,273,098 N. N. AULT, NORTON CO. Production of crystallised carbides substantially non-oxidised by pulverising through a hot jet.

1,272,960 D. O. WALTER, JOHNSON, MATTHEY & CO LTD. Drawing dies.

1,273,103 K. INOUE, JAPAY KABUSHIKI KAISHA. Apparatus for spark machining.

1,273,538 O. PELOUSEK, V. HEMZA, E. SLEMR, F. ZAK, M. ZAK, SMERALOVY ZAVOCHY NP. Method of machining by removal of chips and machine tool for its application.

1,273,632 L. A. WILLIAMS, ANOCUT ENGG CO. Apparatus for machining workpieces by electrolysis.

1,273,413 R. SOZET. Grinding machine and the like.

1,274,050 CARL HURT MASCHINEN- UND ZAHNRADFABRIK. Machine for finishing gears.

1,274,254 H. P. BOVENKERK, GENERAL ELECTRIC CO. Method of producing synthetic diamond.

GERMAN

Patentblatt 1961 Vol 31 (39-42) (Sep-Oct)

Applications Open to Public Inspection

1,114,720 H. F. BOVENSIEPEN, FA. PETERS WOLPERS. Two-disc lapping machine.

1,115,049 G. MAI, DEUTSCHE AKADEMIE DER WISSENSCHAFTEN ZU BERLIN. (Add. 1,099,206). Fine microtome.

1,115,203 D. H. FLEMING jun, UNION CARBIDE CORP. Jet drill for hard mineral layers.

1,115,380 H. E. DE BRUYN, NV PHILIPS' GLOEILAMPENFABRIEKEN. Electrode feed control for electro-erosion.

1,115,608 E. HEER. Multiple-spindle grinding head, in particular for stone working.

1,115,609 G. JAECKEL, DEUTSCHE AKADEMIE DER WISSENSCHAFTEN ZU BERLIN. Method of making aspherical spectacle glasses.

1,115,610 E. FOUQUET. Device for feeding liquid coolant and lubricant in grinding machines.

1,115,611 H. HAUSCHILD. Grinding and polishing machine.

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LIST OF PUBLICATIONS

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***JOURNAL LIST:** January 1962, is a list of periodicals abstracted in *Industrial Diamond Abstracts*. A large number of the journals is available on loan and are accordingly indicated in the list.

***IDR REPRINT SERVICE:** September 1961, authors index, contents list, 12 pp, 7⅜ x 9¾ in. (Reprints 1s each, post free).

***THE DIAMOND RESEARCH LABORATORY:** (booklet) 16 pp, illustr, 11 x 9 in. 1956.

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***DIAMONDS IN INDUSTRY: AN INTRODUCTION:** 12 pp., illustr, 5½ x 8½ in., 1961, in English, French, and German.

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* **Truing of grinding wheels** (from 1910 to 1951). 39 pp, 7⅜ x 9¾ in. 3rd rev ed, Feb 1952.

* **Diamond as cutting tool for metals and non-metallic materials.** 24 pp, 7⅜ x 9¾ in. 2nd rev ed, Nov 1950. Name index, 1951.

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IA : Machining metals and non-metallic substances, by P. Grodzinski, W. Jacobsohn. 2nd rev ed, 55 pp, 7⅜ x 9¾ in. Apr 1949. Price 10s.

II, IIs : Diamond abrasive wheels, by P. Grodzinski. 74 pp, 4 tables, name index, 7⅜ x 9¾ in. Aug 1948/49. Price 13s 6d.

III, IIIs : Truing of grinding wheels, by W. Jacobsohn. 133 pp, 82 illustr, name index, 7⅜ x 9¾ in. Dec 1948/49. Price £1.

IV : Polishing of gem diamonds, by W. Jacobsohn. 40 pp, 83 illustr, 1 table, name index, 7⅜ x 9¾ in. December, 1950. Price 12s 6d.

THE PRINCIPLES AND DESIGN OF A NUCLEAR RADIATION COUNTER WHICH USES A DIAMOND AS ITS DETECTOR, by W. F. Cotty. 18 pp, illustr, 7⅜ x 9¾ in. Oct 1956. Price 2s 6d.

DATA SHEETS FOR THE DIAMOND TOOL DESIGNER AND MAKER—Definition and designation of angles : Comparison of names for tool angles : Plane of chip flow : Clearance and rake angles : Minimum clearance for diamond boring tools : Economic layout of tool tips : Height position of turning tools : Accepted standards. 1945, reprinted Oct 1956. Price 5s.

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* *Publication free of charge.*

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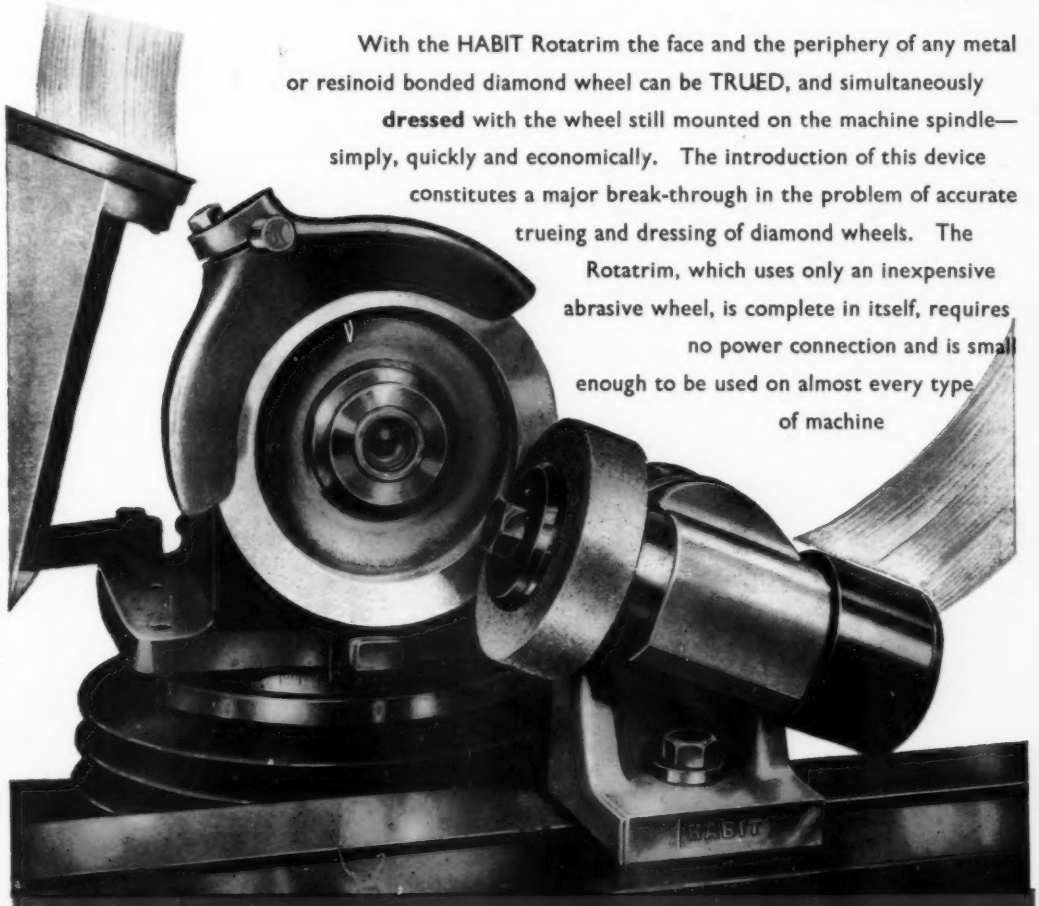

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